This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

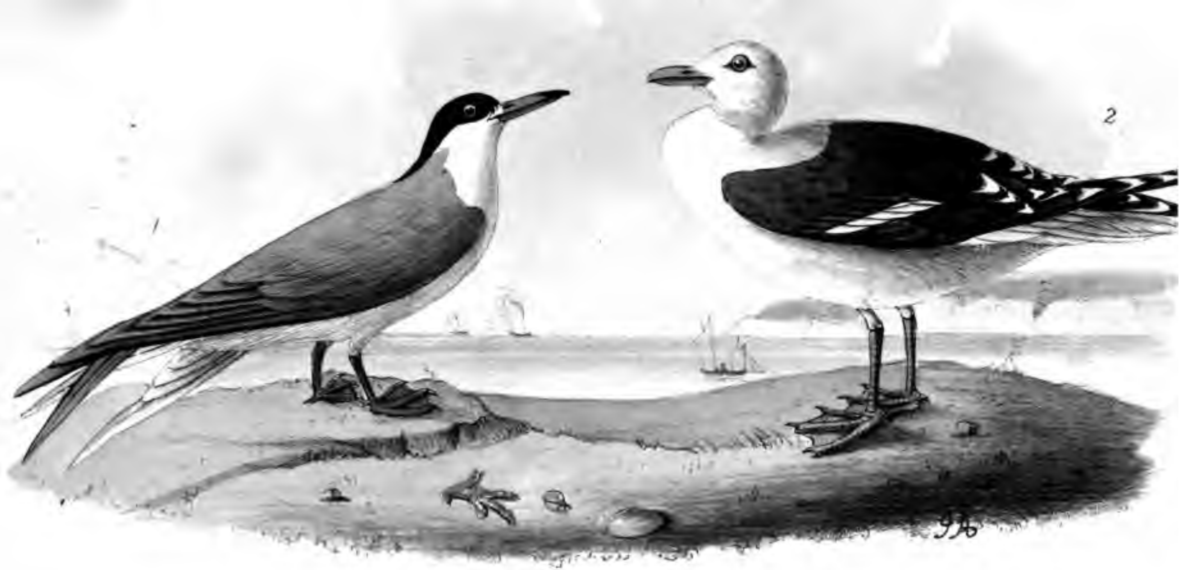
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`



1 Common Sea Swallow

BEAUTIFUL BIRDS:

Their Natural History;

INCLUDING AN ACCOUNT OF THEIR STRUCTURE, HABITS
NIDIFICATION ETC. ETC.

EDITED, FROM THE
MANUSCRIPT OF THE LATE JOHN COTTON, ESQ., F.Z.S.,

BY
ROBERT TYAS, B.A., F.R.B.S.,
AUTHOR OF "FLOWERS FROM FOREIGN LANDS;" "FLOWERS FROM THE
HOLY LAND;" "FLOWERS AND HERALDRY;" "FAVOURITE
FIELD FLOWERS," ETC. ETC.

VOL. III.

WITH TWELVE COLOURED PLATES,
DRAWN AND COLOURED BY JAMES ANDREWS,
And many Wood Engravings.

LONDON:
HOULSTON AND STONEMAN,
65, PATERNOSTER ROW.
MDCCCLVI.

189. c. 155.

LONDON:
THOMAS HARRILD, PRINTER, SILVER STREET,
FALCON SQUARE.

ADVERTISEMENT.

Of the various branches of Natural History, there is perhaps none of greater interest than Ornithology. A knowledge of the structure of Birds, derived from actual dissection and comparison of different specimens, and of their habits, learnt by personal observation, is valuable, deeply interesting, and most instructive.; but the number of those who can thus become acquainted with the feathered tribes is small indeed, yet there are thousands of intelligent minds anxious to know, though it be only by the report of others, the wonders of creative wisdom as displayed in this portion of animated nature. To such these volumes, we trust, will be a most welcome publication.

To what extent the Author has succeeded in making out his theory, as laid down in his Introduction, the Editor does not presume to determine. He has undoubtedly shown much ingenuity, and brought out very distinctly the characters and habits of the various orders and families in a popular form. He has thus rendered a great service to the general reader, who may here learn how admirably each one of the feathered tribes is adapted to perform its peculiar office in the economy of animated nature. To all, these pages are calculated to convey instruction as well as amusement; and to those who habitually "look up through nature to nature's God," they bring confirmation strong of the agency of One Great Cause, and lead them to exclaim with the Psalmist, "O LORD, how manifold are Thy works! in wisdom hast Thou made them all; the earth is full of Thy riches!"

DECEMBER, 1855.

CONTENTS.

	PAGE
Pigeons	1
Head and Feet of Common Pheasant	2
Sternum of Gallinaceous Birds	3
Crop of Gallinaceous Birds	4
Nidification of Pigeons	8
Turtelines	9
Fruit-eating Pigeons	9
Purple-crowned Turteline	11
Crowned Pigeons of India	13
Rock Dove	16
Stock Dove	16
Curassows	17
Guans	18
Crested Curassow	19
Peacocks	20
The Domestic Turkey	22
Peacock-shooting	24
The Argus Pheasant	25
Thibet Peacock-Pheasant	27
Pheasants	29
Reeves' Pheasant	30
Golden Pheasant	31
Silver Pheasant	32
Cocks	33
Bankiva Cock	37
Grouse	39

PAGE
Wood Grouse 41
Ruffed Grouse 42
Common Ptarmigan 46
Sand Grouse 47
Tinnamon 48
Ostriches 49
Bustards 51
The Great Bustard 52
The Rhea 55
The Ostrich 55
The Emu 61
The Apterix 61
Plovers 62
Whimbril 67
Sternal apparatus of Waders 68
Courier Birds 71
Norfolk Plover 72
Thick-kneed Bustard 72
Stone Curlew 72
Ring Plover 74
Kildeer Plover 75
Sandpipers 77
Bill of Tringas 77
Dunlin 78
Oxbird 78
Snipes 81
Godwits 82
American Godwit 83
Avocet 84
Longshanks 90
Mexican Stilt 91
Flamingos 93
Head of Flamingo 94
Tongue of Flamingo 95
Spoonbills 99
White Spoonbill 101
Boatbills 101

PAGE
Herons........ 101
Bill of the Heron 102
White Heron 107
Nesting-place of Great Heron 107
The Common Bittern 112
Cranes 113
Numidian Crane........ 113
White Stork 114
The Marabou 117
The Adjutant 118
The Tufted Umber........ 119
The Open-beak 119
Ibises 120
Sacred Ibis 121
Scarlet Ibis 122
Rails 124
Jacanas 125
Water Rail 126
Water Hen........ 127
Coots 127
Geese 134
Spur-winged Goose 137
Gambo Goose........ 137
Swan Goose.. 138
The Tame Swan........ 138
The Wild Swan 138
Canada Goose........ 141
Egyptian Goose 143
Ducks 144
Sheldrake........ 149
Shoveller 150
Malacorynchus 150
Eider Ducks 152
King Eider 153
Pochard 154
Red-headed Widgeon........ 154
Garrots 155

PAGE
Buffet-headed, or Spirit Duck 155
Divers 157
Grebes 159
Dab-chick 161
True Divers 163
Guillemots 165
Foolish Guillemot 165
Puffins 167
Common Puffin 167
Great Auk 167
Penguin 168
Pelicans 170
Common Cormorant 171
Frigate Pelicans 172
Darters 174
Brown Pelican 175
Gannets 177
Tropic Bird 177
Gulls 178
Terns 178
Sea-Swallows 179
Roseate Tern 181
Skimmer 182
Petrels 183
Albatross 184
Laughing Gull 189
Black-backed Gull 190
Skuas 193
Arctic Jager... 195

1.
2

BEAUTIFUL BIRDS.

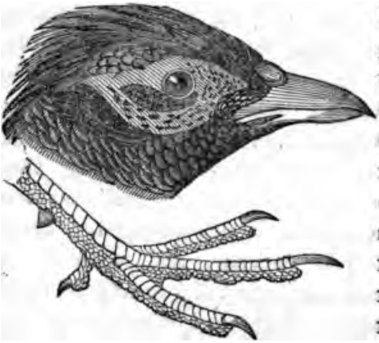
Pigeons.

RASORES—COLUMBIDÆ.

The birds which we now proceed to notice, forming the *Rasorial* order, are essentially ground birds. Gathering their food as they do exclusively upon the surface of the earth, they do not require any peculiar development of flying powers; but it is in their legs, and the muscles by which they are moved, that strength is requisite, and in them we find that the chief power of these birds is concentrated. Their internal organization is peculiar, and adapted to their more terrestrial habits and the nature of their food. They are generally large and heavy birds, are gregarious, gentle, and inoffensive in their habits. They are more easily domesticated than any other birds; their flesh is more nutritive and agreeable to man than that of any other order, and they are especially set apart for his use; their fecundity is therefore great, in order that their increase may keep pace with his wants. In a wild state they inhabit the mountains, the forests, the jungle, and the extensive plain. Many of the species are polygamous, several females associating with one male; others pair, for the season, and do not separate from their progeny till the pairing season again returns.

The Pigeons (*Columbidæ*) and Ostriches (*Struthi-*

onidæ) are included in this order, and they form the aberrant group of our arrangement; the *Tetraonidæ*, or Grouse, Partridges, etc., and the *Crassidæ*, or Curassows, being the two subtypical, and the *Pavonidæ*, or Pheasants, Peacocks, etc., the typical groups. The three latter, which may be denominated the gallinaceous division of this order, exhibit the rasorial characters in the greatest perfection. The bill of the typical group, as seen in the annexed cut of the head of the common Pheasant, is short, or of moderate length, and strong; the upper mandible being generally arched; the nostrils pierced in a broad membranous space at its base, and covered by a cartilaginous scale. The feet of gallinaceous birds are remarkable for their size and strength, the tarsus being much longer than the hinder toe; which latter is remarkably small in comparison with that of perching birds: it is somewhat elevated on the tarsus, instead of being articulated, as in the perching birds, on the same level with those in front; in some species it is altogether wanting. Many of the typical groups have the tarsus armed with one or more sharp spurs, of a horny substance, which serve as weapons of offence and defence in their combats, which are frequent between the male birds during the pairing

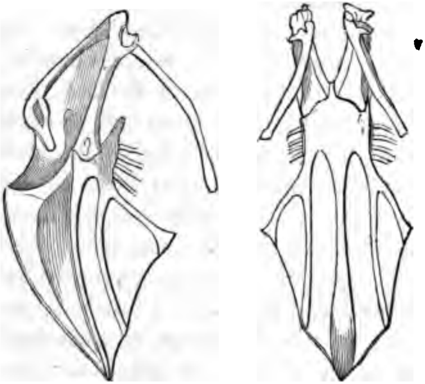


season. The lateral toes are always of equal length, and they are connected at their base to the middle one by a short web or membrane; now were this membrane broader than it is, it would obviously impede the free action of the joints of the toes, but, by merely extending for a quarter of an inch or so, it gives strength and stability to the walk of the bird. The claws are altogether different from those of the perchers, because they perform different functions; they are very slightly bent, that they may not be injured in walking; they are robust, because they are employed in scratching the ground, and they are greatly depressed, or rather horizontally flattened, that this function may be more effectually performed.*

The sternum of the gallinaceous bird differs in many points from that of the insessorial tribe, or those birds which require much muscular strength in the wing. The form is somewhat lozenge shaped, though rather long in proportion to its breadth. The posterior portion is much weakened by two emarginations on each side, so wide and deep that they occupy nearly the whole of the sides, leaving only slender processes of bone for nearly three-fourths of the entire length of the sternum. This renders the posterior portion of the sternum, as well as the ribs, flexible, in order that the one side may contract, and the other expand on the advance of the leg, as much as shall keep the axis of the body steady to the line of motion, and these birds are thus enabled to run straight forward and with considerable speed, without hopping, as is the case

---

* Classification of Birds, vol. i.



with perching birds in general.* The ridge of the keel is obliquely truncated forwards, so that the sharp point of the furcal line is united to it only by a ligament, by which the effect of the pectoral muscles is greatly weakened, and the flight rendered laborious. A figure of the sternum of the Partridge is given in the cut, which represents the profile and under surface of that bone. In consequence of the weakness of the sternum, the gallinaceous birds have generally a heavy flight, and seldom take the air unless closely pursued by some enemy.

The crop or craw of gallinaceous birds is extremely large, and they have a very vigorous gizzard. With few exceptions, they all lay and hatch their eggs upon the ground, on a few carelessly arranged blades of straw or grass, and the young ones commonly are able to use their legs as soon as they have left the shell. The male bird, who usually associates with several females, generally speaking, takes no sort of trouble either with the nest or young ones.

Though the gallinaceous birds chiefly subsist on grain, and the seeds of plants, yet they likewise eat insects, grubs, and worms, and some of them even snakes and reptiles. The food is macerated in the crop before it is taken into the gizzard, where it undergoes trituration. The gizzard is a very strong muscular viscus, whose internal crust is hard and cartilaginous. The functions of the gizzard are considerably aided by the small stones which are pretty freely swallowed by these birds, and being retained in the gizzard, so bruise the grain that the gastric juice may act more effectually upon it. The gastric juice, in this family, is not supplied by the stomach itself, but by the gullet, in which the feeding glands are placed, and from which it trickles down into the stomach. The action of the stomach of the gallinaceous birds has been compared to that of a corn-mill; for, while the two sides of the gizzard perform the office of the mill-stones, by pressing and rubbing in contrary directions the grain that is placed between them, the crop or craw, like the hopper in the mill, continues to give out the grain in small quantities in proportion to the progress of trituration.

---

* Mudie's Nat. Hist. of Birds.

The plumage of many species of the rasorial birds is extremely brilliant, and elegantly varied in colour; the tail-feathers in some of them being produced to an extraordinary degree, and forming a most magnificent train, which is capable of being raised and expanded by the bird, when desirous of displaying his splendid attractions. The wings are muscular, but the quill-feathers are short, unusually convex, and much rounded; they are not required for long or rapid flight, the birds being provided with another means of escape from their enemies in the great strength of their lower limbs, which is developed, as before observed, at the expense of the muscular power of their wings.

Gallinaceous birds are of a hardy constitution, and are distributed over most parts of the globe, being found in the hottest as well as the coldest climates. A beautiful provision is observed in the more abundant and warmer clothing of those birds which inhabit the northern districts, against the severity of the weather in those parts; and a corresponding diminution of the quantity of plumage in those species which are natives of tropical countries.

Most of the birds of this order are in the habit of perching, and particularly at night, as a means of safety; but a gradual diminution of the perching power will be observed in the several families of which it is composed, as we recede from the confines of the insessorial birds.

This tribe or order is divided into five families, which we arrrange in the following manner:—*Columbidæ*, *Crassidæ*, *Gallinidæ*, *Tetraonidæ* and *Struthionidæ*.

That the *Columbidæ* form the passage from the *Insessores* to the *Rasores* there can be little doubt. They have been alternately arranged by systematic writers among the perching and gallinaceous orders, and not unfrequently grouped as a separate order between the two. In the *Crassidæ*, we observe the hinder toe still placed on the same level with those in front, as in the perching birds, but in their habits these birds approach much nearer to the typical groups than the *Columbidæ;* they therefore form the first subtypical group. The Cocks, Peacocks, Pheasants, etc., evidently form the most typical group of the whole order; these are followed by the Grouse, Partridges, etc., which in the diminutive size or absence of the hallux, in some of the species, lead us on to the *Struthionidæ*, where that member is entirely absent.

The anatomy of the *Columbidæ*, both external and internal, as well as the general habits and economy of some of the species, show their close approximation to the rasorial birds. Their food and habits, their internal economy, and the formation of their bills, Mr. Vigors observes, identify them with the *Rasores*, while, on the other hand, the characters which bring them near the *Insessores*—their divided toes and comparatively short legs—are weakened by the resemblance which those members bear to the same parts of the contiguous order in their general structure, and more particularly, in the bluntness of the nails, so strongly indicative of the rasorial habits of the gallinaceous tribes.*

One very striking difference from the gallinaceous birds consists in the permanent pairing of the two sexes, and their constancy to one another. The male bird assists in the construction of the nest, and even takes his turn in incubation, and participates in the care of the young, which do not leave the nest until they are fully fledged.

Many of the Pigeons possess a powerful flight, equal, or nearly so, to most of the preceding order, and they are in the habit of making periodical flights, in some countries, from parts where food is scanty, to others at a distance, which may yield them a more bountiful supply. The hinder toe is placed on the same level with those in front, so that the foot is enabled to embrace a branch with the firmness of that of an insessorial bird.

---

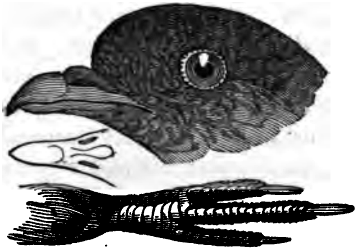
* Linnæan Transactions, v. 14.

In their mode of nidification the majority of the *Columbidæ* resemble the *Insessores;* for, with the exception of some few of the ground Pigeons, they build their nest in trees. The number of eggs laid at each period of hatching is (with the above exception) restricted to two, and these are of a white or yellowish-white colour. Some of the ground Pigeons are so deficient in wing-power that their flight can only be supported for a short period; their wings are short and rounded, and, when expanded, rather concave beneath, like those of the common Partridge. This deficiency of flight, however, is in a great degree compensated by the increased length of their legs, which enables them to run with great rapidity upon the surface of the ground.

One part of the internal organization of the Pigeon is worthy of special notice. The crop, in the state which is adapted for ordinary digestion, is thin and membranous, and the internal surface is smooth; but by the time the youug are about to be hatched, the whole, except that part which lies on the trachea, becomes thicker and puts on a glandular appearance, having its internal surface very irregular. In this organ it is that the food is elaborated by the parents before it is conveyed to the young; for a milky fluid of a greyish colour is secreted and poured into the crop among the grain or seeds undergoing digestion, and a quality of food suited to the nestlings is thus produced.

The Pigeons form an elegant and very numerous group of birds. They are widely distributed over the globe, the form occurring almost everywhere, except within the frigid zones. It is, however, in the tropical climates of Southern Asia, and the islands of the great Indian Archipelago, that the species swarm in the greatest variety and abundance, for in these warm and genial climates, Mr. Selby observes, a never-failing supply of food adapted to each kind is always to be found. It is here that most of the thick-billed Pigeons (genus *Vinago*), vying with the parrots in the colour of their plumage, and in some respects resembling them in their manners, luxuriate amidst the thick and umbrageous foliage of the banyan, and other trees, whose fruit affords them a rich and never-failing repast. It is here, also, that the small and beautiful *Ptilinopi*, or Turtelines, and the larger *Carpophagæ*, or fruit-eating Pigeons, are met with. It is in the odoriferous regions of the Spice Islands that those curious birds, the Great Crowned Pigeon, or Goura, and the Nicobar Ground Pigeon, remarkable for their respective deviation from the proper columbine form, find a suitable abode; besides a variety of other species belonging to different groups. In both regions of the American continent we meet with a great variety of species, many of them possessing the typical form of the family, as represented by the Ring Pigeon, or the common Pigeon; others approaching, both in form and habits, in a greater or less degree, to the typical gallinaceous birds, and in a manner taking the place of or representing certain forms of the *Tetraonidæ*, of which that continent is destitute. In Europe, the species become greatly reduced in number, and are confined to its warm and temperate districts, as it is only where the cereal and leguminous plants flourish, and the oak and the beech bring their fruit to perfection, that the Pigeons can find a regular supply of their appropriate food; and even in many of those districts where they abound during the summer and early autumn months, they are obliged to migrate to warmer latitudes during the severity of winter, when the ground becomes congealed by frost, or covered with snow.*

The genus which approaches nearest in this extensive family to the insessorial birds, appears to be that of *Vinago*, the fruit-eating Pigeons of Africa and India. In these birds the bill is stronger and more solid than it is usually found to be among Pigeons in general; the tip or horny part being of a very hard substance, much hooked and inflected. The nostrils are more exposed, and scarcely exhibit any appearance of the swollen or projecting membrane, so conspicuous in the common Pigeon. The legs are very



---

* Selby, Nat. Hist. of Pigeons.

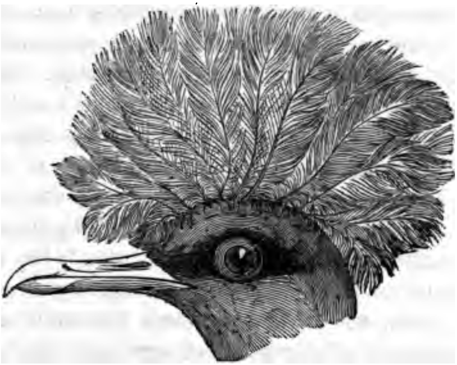
short, and the toes broad and formed for clasping; the exterior toe is longer than the inner one, and the claws are very strong, sharp, and semicircular. The wings are of mean length, but strong and pointed, the second and third quill-feathers being nearly equal, and the largest in each wing. From this genus there is a series of groups leading gradually to the true *Columba*, of which the European species, both wild and domestic, are good examples. Many of these intervening species have exceedingly handsome plumage, of which the genus *Ptilinopus* appears to be the most beautiful. The ground-colour is generally of a deep rich green, frequently very glossy; while the head and wings are generally variegated with blue, white, purple, etc. These belong also to the hot latitudes of the Old World, although they appear to be more abundant in the Indian and Australian islands.

The Purple-crowned Turteline (*Ptilinopus purpuratus*, Sw.) is a very lovely species. This elegant little bird is a native of Otaheite, and others of the Friendly Islands, where it is found numerously dispersed in all the wooded districts; it is also met with in the Celebes, the Isle of Timor, and in Australia.

The length of this species is from nine to ten inches. The bill is of a grey colour. The forehead and crown are covered with a patch of rich amaranth or rose-lilac colour, bordered round by a narrow band of King's yellow. The cheeks, occiput, and sides of the neck are of a delicate greenish-grey. The chin and throat of a pale gamboge-yellow. The feathers upon the lower part of the fore neck and breast are of a peculiar form, their colour a delicate pale green, tipt with a cinereous or ash-grey, having, as it were, a piece cut out from the tip of each in the form of a **V**. Beyond the breast is a band of pale green, succeeded by a small spot of rose-lilac in the middle of the belly, which passes into rich orange; that again by degrees fades into pure yellow, which occupies the vent or lower part of the abdomen. The flanks and sides are pale green; the under tail-coverts rich orange. The upper plumage is of a rich and glossy parrot-green; the scapulars, with their central part, of a deep purple or blue, according to the light in which they are viewed. The wing-coverts and secondaries are margined with yellow. Greater quills, with their anterior webs, black, glossed with green; the inner blackish-green. The tips of all (except the two central feathers, which are wholly green) with a broad band of rich yellow. The tarsi are covered nearly to the division of the toes with soft thick-set yellowish-green feathers. This species is a constant inhabitant of wooded districts, where it subsists upon various fruits and berries, among which are enumerated those of the *Limonia bifoliata* and *banana.* Its voice or cooing notes are said to be pleasing in tone, and it is probably from their sound that it has obtained, in Tongataboo, the name of *Kurukmu.* In Otaheite it is called Oopa or Oopuro.

In their dimensions, the bills of these birds are much more slender than those of the genus *Vinago,* and thus mark the transition to the ordinary Pigeons. Hence, Mr. Vigors observes, we are led by several intervening species to the *Columbi-gallines* of M. Le

Vaillant, which, still retaining the soft and flexible bill of *Columba*, approach the typical gallinaceous birds in their more typical elevated tarsi, and in their habits of living in company and seeking their nourishment chiefly on the ground. Among them may be noticed some forms—*C. Nicobarica* and *C. caruncalata*, for instance—which possess the feathered appendages, together with the naked face and caruncles of the Linnæan *Gallinæ;* and another group, the *Lophyrus* of M. Vieillot, which exhibits the size and general form of the same birds, as well as the singular plumes which frequently decorate their head. This last-mentioned genus, formed of the Crowned Pigeon of India, possessing the strongly formed leg and foot of a typical species of gallinaceous birds, but without the spurs, while at the same time it retains the bill of *Columba*, may be observed to open the passage immediately from the present to the succeeding family* (*Phasianidæ*) ; according to our arrangement,



---

* Linnæan Transactions.

ranean; and in the island of Teneriffe its numbers are almost beyond belief.

The Rock Dove is amazingly rapid in flight. It is distinguished by the whiteness of the lower part of the back, and the two distinct bands of leaden black across the wings. These marks are commonly met with in our dovecote Pigeons, and when, in fancy kinds, they are obliterated by the skill of the breeder, they are always ready to return, which readiness renders it difficult to keep up a particular fancy stock.

The habits of the Stockdove are widely different. It does not frequent rocks, but confines itself within circumscribed limits, being found almost exclusively in the midland counties. In Hertfordshire it is common, but is rarely seen in the southern and western counties, and still more rarely in the northern. It makes its nest of twigs, in the holes of decayed and timeworn trees, and in cavities on the tops of pollards, but never places it on the forked or spreading branches of a tree. It lays only two eggs for each incubation, which habit is common to all the Dove tribe.

Curassows.

CRACIDÆ.

The *Cracidæ*, or Curassows, like the birds of the preceding family, are distinguished by all their toes being placed on the same plane or level, the three anterior toes united by membrane as far as the first joint; their legs are destitute of the spur which is characteristic of the typical rasorial birds, and the tarsus, in proportion to the size of the bird, is short; the hind toe is much developed, which enables them to secure a firm hold upon the branches of trees, and they accordingly as much frequent trees as they do the ground. They are natives of South America, dwelling in the forests of that country, and feeding upon seeds, fruit, buds, etc. They seek their food upon the ground, and nestle among the branches of trees. Their tail, which is composed of twelve large feathers, is capable of being erected in the male bird, like that of the turkey-cock. Their wings are short; and their head is often ornamented with a crest of curled feathers. Their flesh is generally accounted exceedingly good, and they breed freely in their native wilds.

These birds are generally more or less remarkable for the development of their windpipes, which are frequently prolonged in sinuous convolutions; a structure which is rarely met with elsewhere among gallinaceous birds, although not unfrequent in the swimming and wading orders. The bill is of moderate length and considerable thickness, deeper than broad, covered at the base with a naked cere, with the upper mandible curved and vaulted from the base to the point, and sometimes surmounted by a gibbous protuberance; the nostrils are lateral, longitudinal, partly covered above, and open in front.

The genus which exhibits the nearest approach in its characters to the last family appears to be that of *Penelope*, known by the more familiar name of Guans, or Yacous, as they are called by the natives of Brazil. In the more lengthened form of bill and insessorial foot, these birds bear greater resemblance to the perching birds than any of their congeners. It is evident, says Mr. Swainson, from the structure of the claws, that these birds are much more arboreal than their congeners, for their claws are more curved; and from their *lateral* and not *horizontal* compression, as well as from their acuteness, we conclude that they are very little if at all employed in scratching the ground, their structure being similar to those of perchers, and adapted only for clinging. The foot, in fact, of the *Penelope* is not a rasorial but an insessorial foot, for it does not possess any one of the rasorial characters. Even the hind toe, which in all other rasorial birds is raised above the heel, is here placed upon the same level as the anterior toes. Other peculiarities of this genus consist in the nakedness of the cheeks and a circular space round the eyes; the skin of the throat is destitute of feathers, and capable of considerable distension. It is the largest bird of the genus that has yet been discovered, measuring fully thirty inches in length, of which the tail constitutes thirteen or fourteen.*

Of the genus *Crax*, perhaps *Alector*, or the Crested Curassow, is the most common bird. It is a native of Mexico, Guiana, and Brazil, inhabiting the woods in large flocks. In many parts of South America these birds have been reclaimed, and are said to be as peaceable inhabitants of the poultry-yard as our domestic fowls. In the woods of Guiana it appears to have been at one time so extremely common that, according to Mr. Swainson, it was regarded as the most certain resource of a hungry traveller, whose stock of provisions was exhausted, and who had consequently to trust to his gun for furnishing him with a fresh supply. They congregate together in numerous flocks, and appear to be under little or no uneasiness from the intrusion of men into their haunts. Even when a considerable number of them have been shot, the rest remain quietly perched upon the trees, apparently unconscious of the havoc that has been committed among them. This conduct is by no means the result of stupidity, but proceeds rather from the natural tameness and unsuspiciousness of their character. Those, however, which frequent the neighbourhood of inhabited places are said to be much wilder and more mistrustful, being kept constantly on the alert to avoid the pursuit of the hunters, who destroy them in great numbers. They build their nests in the trees, forming them externally of branches interlaced with the stalks of herbaceous plants, and lining them internally with leaves. They generally lay but once a year, during the rainy season; the number of their eggs being, according to Sonnini, five or six, and to D'Azara, as many as eight. They are nearly as large as those of a turkey, but are white like a hen's, and with a thicker shell. From the eagerness with which these birds are sought after, they are yearly becoming more scarce in their native clime.

---

* Habits and Classification of Birds.

The plumage of the Crested Curassow is of a deep black, with a slight gloss of green upon the head, crest, neck, back, and upper part of the tail; and dull white beneath and in the lower tail-coverts. Its crest is from two to three inches in length, and occupies the whole upper surface of the head. It is curled and velvety in its appearance, and capable of being raised or depressed at will, in accordance with the temporary feelings by which the bird is actuated. The eyes are surrounded by a naked skin, which extends into the cere, and then assumes a bright yellow colour. In size the bird is almost equal to a turkey.

This species has bred in Holland, and is common in a domesticated state in the Dutch settlements of Berbice, Essequibo, Demerara, and other colonies. It requires but little care. In aviaries it is known to suffer, as the rest of the group do, from wet or damp, which produces mortification and consequent loss of the toes. Abundance of room, a dry soil, with trees on which to perch, and a sheltered situation, are essentials in every attempt to naturalize this very valuable bird.

Peacocks.

GALLINIDÆ.

of the handsomest and most elegant birds of
hole order are contained in the family that now
under our notice (the *Gallinidæ*). They are dis-
shed by having the tail very much developed,
tail-coverts, in some of the species, elongated into
s of extreme beauty and extent. The tarsus of
ales is usually armed with sharp spurs; and the
r toe, which is very short, is elevated, as the tarsus,
above the plane of the others. In this group we
he different species of cocks, which are scattered
ofusely over the hotter latitudes of Asia; the
ys, Pheasants, Guinea Fowls, etc. The whole
genera belonging to this division, with the ex-
n of the Turkey, are natives of the warm lati-
of the Old World: the latter bird is indigenous
nerica, from whence it was transported to other
ries. They are all woodland birds; and though
ll feed and most of them nestle on the ground,
are, generally speaking, perchers, invariably
ting to a perch in the trees for the night. These
e birds whose flesh affords to man most nourish-
d wholesome food, and it is therefore ordained
enevolent Providence that they should come,
eir own nature and instinct, the nearest to the
of his abode; and that, like the ruminating
alia, they should herd in flocks, so readily be-

come subject to domestication, and have so little fear of mankind.

In this family we find the typical form of the rasorial bird in the genus *Gallus;* but that which appears to approach nearest, in its general character and appearance, to the *Cracidæ*, is the genus *Meleagris*. In this genus is comprised the domestic Turkey, which is the common wild Turkey of America; and another, still more beautiful, inhabiting the forests of Honduras. This latter (*Meleagris ocellata*) has the tail-feathers ornamented with eye-like spots, something in the manner of the oriental Peacocks. This species has never yet, it is believed, been seen alive in Europe, and is even so rare in our museums, that only one specimen, now in that of Paris, is known to exist. Of its natural history we know nothing whatever.

We will not attempt to expatiate on the magnificent appearance of the genus *Pavo*, or on the effulgent colours that are so beautifully harmonized in the tail of these birds. Who can behold a single feather of this resplendent train without astonishment and the utmost admiration! Examine the feather, scrutinize the delicate fabric, regard the glowing, refulgent tints and changing colours that pervade the whole substance of the plumage, and then recall the unattractive appearance of the egg, the yolk, and mucilaginous substance it contains, and turn to the works of man. The cloth of gold and silken tissue of varied dye, however elaborate in their structure and splendid in appearance, are nothing to the living lustre that is given to one plume of the Peacock's train. The eye alone can *convey any idea of* the perfect beauty of the Peacock's feathers. Nor is the form of the Peacock without its attractions; the smallness of the head, which is adorned with an elegant crest, the length and delicacy of the neck, and the gradual swelling of the breast and body, combined with the somewhat stately walk of these birds, tend to render them objects of attraction, peculiarly fitted to adorn the luxuriant grounds of noble mansions.

The native regions of the domestic or common Peacock are in the southern provinces of Asia, whence it was imported "in the ships of Tarshish," so far back as the reign of King Solomon. Numbers of them are still found in India, especially in the richly wooded dells of the western ghauts. They are hardy birds, and encounter with impunity all the changes of the weather in the variable climate of this island, roosting at night in lofty trees. In the forests of the north of Europe they are found at the present time in a wild state, having in all probability escaped from confinement, and finding the forests more congenial to their habits than the vicinity of human abodes. It is in Norway that they are understood to spend the summer months, retiring, on the approach of severe frost, into Germany.* Peacocks are also found to thrive in North America, notwithstanding the severity and duration of the winter season. They roost aloft in trees, or on the tops of houses or steeples, whence they utter their discordant screams, which are frequently repeated, especially before rain.

Captain Williamson, in his "Oriental Field Sports," thus describes the habits of these birds in a state of nature. They abound chiefly in close wooded tracts, particularly where there is an extent of long grass for them to range in. They are very thirsty birds, and will remain only where they can have easy access to water. If there be trees near such spots, the Peacocks may be seen mounting into them, every evening towards dusk; there they continue until the sun rises, when they descend to feed, and pass the mid-day in the heavy covers. They are very fearful of all quadrupeds, especially of dogs, since they are preyed upon by jackals, and probably by tigers. Their nest is made on the ground, commonly on a bank slightly raised above the surrounding level, where, in some appropriate bush, they collect leaves, small sticks, etc., and sit so close as not to be scared even by passengers whom they can see: they hatch from twelve to fifteen eggs, and the old birds attend and lead out the young in the same way as our domestic fowls.

---

* British Cyclopædia.

The Peacock is not found within a considerable distance from Calcutta, but their general rendezvous seems to be in the Junglelerry district; here they assemble in immense bands, covering the woods with their beautiful plumage, and feeding in the small patches of plain among the long grass.

Peacock-shooting is one of the field sports of our countrymen in India. It is somewhat dangerous, however, inasmuch as the places they inhabit are also such as are in general most frequented by the tiger. When numbers are scattered in a jungle it is easy to get a shot; but when they are united in flocks of about forty or fifty together, they seldom rise on the wing, but run with such speed that a heavy spaniel or pointer can barely keep up with them. When on the wing, like nearly all rasorial birds, they fly strong, but very heavy; and if merely winged, they soon recover their fall, take to their legs, and generally escape.

Formerly Peacocks were much more valued for the table than they are now, yet at the present young birds are considered a great delicacy.

The female Peacock, like several other rasorial birds, after ceasing to lay eggs, not unfrequently assumes the plumage of the male. Albinos, or white Peacocks, are not uncommon; yet even in these the ocellated spots may still be traced by a different undulation in their shade.

The genus, or rather sub-genus, *Polyplectron* contains some extremely handsome birds, the Argus Pheasant being a well-known example, all of which are natives of China, or the Indian islands. These birds appear to be equally hardy with the Peacocks, living and thriving well in confinement; and if they could be procured in sufficient numbers to ensure a stock, would prove a desirable and lovely addition to the ornamental poultry-yard. The chief distinction is in the form of the tail, which is rounded, and very ample; the feathers stiff, and forming a plane surface. It is never erected, like that of the Peacock or Turkey, but is capable of a very wide expansion. The tarsi are furnished with two, and sometimes three spurs upon each.

A very singular form is presented in the Argus Pheasant, or gigantic Argus (*Argus giganteus*). It is chiefly remarkable for the superabundant development of its plumage, particularly that of the wings;

while its colours, though possessing little of the brilliant splendour of those which we have passed, by a union of chaste tints and harmonious blending, produce an effect at once unique, striking, and pleasing. It is a native of Sumatra, and probably some other of the Indian islands, but principally of the peninsula of Malacca.

In size the Argus is not larger than an ordinary fowl, but the length to the end of the two long tail-feathers is five feet three inches, these last being of themselves three feet eight inches. It is impossible to convey any idea of the markings and blending of the shades in many parts of this bird, and the following description will serve only as an indication of the colours. The throat, the anterior part of the neck, and the cheeks are naked, or nearly so, having only a few black hairs dispersed over them. The head and back of the neck are covered with short velvety feathers. The lower part of the neck, breast, belly, and thighs are reddish-brown, each feather regularly spotted with dull yellow and black; the upper part of the back and lesser wing-coverts are covered with large black spots separated by a narrow line of an ochreous tint; the upper tail-coverts are of a clear ochreous yellow, with brown spots; the longest of a paler tint, with the spots thicker than upon the back, and of a reddish-brown in the centre. The tail is of a deep chestnut, sprinkled with white spots, surrounded with a black ring. The wings, of which the secondaries are three times the length of the quills, being about two feet ten inches long, from their unwieldy size almost *entirely deprive* the bird of flight, but greatly accelerate its pace when running, and, acting as powerful sails, furnish it with a mode of transportation or escape possessing great fleetness. The power of flying, however, adds M. Temminck, is not altogether denied to it; it sometimes rises from the ground, but the flight is always heavy, and kept up only for a short way, and upon these organs, and particularly upon the secondaries, is lavished the greater part of the beautiful adornment. When at rest, or not excited, these spots are hardly visible; but when in the presence of his females, the wings are expanded and trailed upon the ground, displaying their beauties, as the Peacock exhibits his train, or the Turkey his tail. At this time the tail is comparatively spread, and is raised erect. When it rests, it is carried in a line with the body, and with the two plumes folded together.*

The habits of this singular bird are unknown to ornithologists of this country.

The Thibet Peacock-Pheasant (*Polyplectron Thibetanum*) is supposed to be a native of the mountain region which separates Hindostan from Thibet. Living specimens are often kept by the Chinese in their aviaries. Mr. Bennett saw two "Peacock-Pheasants" in Mr. Beale's aviary at Macao, which he says had been brought from Cochin-China. An individual of this species lived in an aviary at the Hague for five or six years, and M. Temminck's figure of the bird was taken from that specimen. These birds are said to be very hardy, and an opinion has been confidently expressed that they might be naturalized in this country, though we have no positive information of such an object being attempted. The male is about two and twenty inches in length; it has no crest, but the small greyish-brown plumes on the crown of the head are turned forwards, and appear as if ruffled; head, neck, breast, and belly brown, with transverse waved bands of blackish-brown; throat whitish; back, rump, and tail-coverts clear brown, spotted and waved transversely with greyish-white; quills brown, marked with greyish; wings, generally, yellowish-grey sprinkled with small blackish-brown bands, each feather having at its extremity a large, round, ocellated, brilliant blue spot, shot with purple and opaline hues; a circle of deep black, which is, in its turn, set in a ring of yellowish-white, surrounds each of these iridescent spots; tail-feathers dull brown, sprinkled with small ochraceous spots. Upon each of the twenty-two true tail-feathers, at about an inch and a half from the tip, as well as on those of what have been called the upper range, at about an inch from the tip, two oval spots with purple and blue reflections, with double circles of black and white, like those of the wing, but hardly so brilliant, are separated by the shaft only. The female differs from the male in having the ocellated spots less brilliant, a shorter tail, and no spurs.

---

* *Nat. Hist. of* Gallinaceous Birds: Sir W. Jardine.

The Ring Necked Pheasant.

Pheasants.

SCARCELY less elegant in form, and yielding only to the Peacocks in beauty of plumage, the Pheasants, forming the genus *Phasianus*, now claim our attention. They are distinguished by the following characters. The bill is of moderate length, arched and convex on its upper surface and slightly depressed towards the point, having the nostrils placed laterally near its base, and covered with a cartilaginous scale. The cheeks are thinly clothed with minute velvety feathers; and the rest of the head, as well as the entire throat, is covered with plumage. The wings are short, but firm and compact. The tail is long, narrow, and arching, composed of eighteen feathers, forming two vertical planes, and overlapping each other in regular gradation, the two middle ones being considerably longer than the rest. The tarsi of the male birds are furnished with a strong conical spur; and the three anterior toes are united at the base by membrane as far as the first joint; the claws are short, strong, and but slightly curved. Their flight is heavy and fluttery, and apparently produced with considerable effort.

All the known species are natives of Asia, where they inhabit woods and wooded places, perching in trees during the night, but feeding and nestling upon the ground. As is the case with most of the order, their nests are very rude, and hardly deserving of the name. The broods are numerous, but the numbers vary a good deal with the character of the climate in which they may be bred. The young, when they first make their appearance, are covered with soft down; and they can run and pick up their food almost as soon as they break the shell.

There are several species and varieties of Pheasants, many of which breed together, and produce hybrids. The Pheasant will likewise breed with the common fowls, which indicates their near alliance to one another. The former, however, is much less social in disposition, and seldom breeds in captivity, unless under the most favourable circumstances; it also manifests excessive sensibility to the impressions of a variable atmosphere, and the influence of a northern climate.

The Pheasant breeds in April, the young being hatched at the latter end of May, or the beginning of June. The nest is a rude structure, placed on the ground under the covert of fern; the eggs are from ten to fourteen in number.

The food of this bird is very miscellaneous; Jerusalem artichokes, potatoes, buckwheat, beans, peas, barley, and wheat are favourite articles of diet; so also are bulbous roots, as those of the tulip, the buttercup, etc. For these the bird digs with his bill and feet. To this list must be added wild berries, sloes, haws, berberries (*B. aquifolium*), etc., and also insects, the larvæ of ants, etc.

Reeves's Pheasant (*Phasianus veneratus*, Tem.) is a splendid bird, a native of the north of China, and the snowy mountains of Surinagur; but no living example ever reached Europe until the one brought over by

J. Reeves, Esq., of Canton, in 1831, and presented to the Zoological Society. In 1834, a second specimen was procured by the same gentleman, and sent to the Society's menagerie. This species is remarkable for the length of its tail, and especially of the two middle tail-feathers, which, when fully grown, measure six or seven feet in length; they are beautifully barred with curved bands of dark brown on a grey ground, the bands passing into pale chestnut at the edges. In size the bird exceeds the common Pheasant. In manners Reeves's Pheasant closely resembles the common Pheasant, as far as can be judged by the actions of the living specimens alluded to, and there can be little doubt that it might be naturalized in this country. Upper surface generally golden-yellow, each feather having a distinct margin of black; the head white, naked space round the eye scarlet, and a black streak passes over the ear-coverts to the back of the head; throat white, bounded by a gorget of black; the feathers of the sides white in the centre, with barb-shaped marks of black, and a deep red-brown border; under parts black.

The Golden Pheasant (*Phasianus pictus*) is a richly coloured species, and is commonly found in our aviaries, where it breeds freely. This bird is a native of China, and, according to Latham, it is there called Kenki or Kenkee, a word which means gold-flower fowl. It is a great favourite, as its extreme beauty would readily lead us to imagine. A silky crest of a fine amber-yellow colour ornaments the head. The feathers which clothe the back of the head and neck are square, arranged in scales, and are of a rich orange-red, edged with a line of black, and capable of being raised up at will; below these, so as to encroach upon the top of the back, is a space of dark, glossy, greenish feathers with rounded edges, arranged scale-like; the back is rich yellow, as are the upper tail-coverts, with a crimson border; the tail-feathers are mottled with chestnut and black; the wings are deep blue at their base; quills and secondaries brown, with chestnut bars; the whole of the under surface intense scarlet. The female is of a uniform rusty brown, with darker marks and spots, and the tail is comparatively short.

One of the most elegant species is the Silver Pheasant (*Phasianus nycthemerus*); it is also a hardy bird, and easily tamed. The beautifully contrasted colours and the delicacy of its markings, which have caused it to be named the Pencilled Pheasant, have generally procured it a place in our menageries and museums, and it is therefore well known. It is a native of the northern parts of China, where it is frequently kept in a tame state. Being perfectly hardy, it is reared with ease, and, together with the Golden Pheasant described above, forms an extremely beautiful ornament to our aviaries.

We need only point to the genera *Lophophorus* and *Euplocamus* as examples of the exquisitely beautiful plumage possessed by these birds; the splendid refulgent tints with which their feathers glow are not surpassed in nature.

Cocks.

The characteristic features of the genus *Gallus* are familiar to most persons; the fleshy comb and wattles, the erect position of the tail, and the graceful curvature of the central feathers, the hackled plumage of the neck, the bold upright gait, the great courage, and social nature of these birds distinguish them from the rest of their tribe; and their universal application to the use of man as a nutritious and delicate species of food, together with their great facility of domestication, point them out as the typical group of the rasorial birds. Of all other birds they appear to have been the first reclaimed from the forest, and taken to supply the accidental failure of the luxuries or necessaries of life. No other birds afford so bountiful a supply of wholesome food to man, or contribute so greatly to furnish his table with nutritious delicacies. In all countries and in every clime they have become completely domesticated, and appear almost essentially requisite to civilized life.

The most remarkable characteristics of the Cock are the fleshy crest and wattles. All the varieties have a naked space on the cheeks and round the eyes, which is of the same texture as the comb and wattles, and varies in colour like them, according to the condition of the bird or state of the atmosphere. This character belongs to the female as well as the male;

but in the female the crest and wattles are m
rudimental, excepting in some individuals which
become barren, when they acquire a sort of n
appearance, intermediate between that of the
and the fertile female. The horny spur on the
sus also, which serves the male as a weapon of
and which is only rudimental, if at all visible, i
female, sometimes appears in those that have be
barren. It is well known that the pointed fe
on the neck of the Cock, called the hackle, in a
of repose form a kind of mantle on the neck
upper part of the shoulder; but when the b
excited and "shows fight," they are erected, and
to break the force of any stroke that may be
against that part of the body. The males appe
be essentially birds of battle and warfare; and
have ever been celebrated for the spirit and v
that they display in the combat. Pliny summe
the knowledge that he could obtain of these bir
the following words:—"Next to the Peacock, the
which are most sensible to glory are those active
tinels which nature has produced to rouse us fro
matin slumbers, and send us to our daily occupa
They are acquainted with the course of the stars
every three hours they indicate by their crowin
progress of the day.. They retire to roost wit
setting sun; and, with military precision, a
fourth watch with loud reveillés recall us t
labours and our cares. They do not suffer the
beam to surprise us without timely warning
they announce it by crowing and by the clappi
their wings. They are commanders and rul

their kind. Every farm-yard has its king, whose sovereignty has been gained by battle; and they appear instinctively to comprehend the nature and use of those spurs with which their legs are armed. It is not uncommon for both combatants to perish in the contest; but if one of them should happen to be conqueror, with loud crowing he proclaims his victory, and sounds his triumph; the other, with drooping head, abashed at his defeat, retires in silence. The gait of the Cock, not only those of game but the very dunghill breed, is proud and commanding; in stately mien he carries his head erect, the comb upon his head appearing as the crest of a soldier's helmet. Alone of all birds he habitually looks up to the sky, raising at the same time his curved and scythe-formed tail, inspiring terror in the lion himself, that most intrepid of animals."

The Cock is more stately in his march than any bird, or, indeed, than almost any animal. His tread is slow and firm, his step long, and his whole frame expressive of energy and vigour. The eye of the Cock is lively and animated, his air proud and independent, without anything ferocious or menacing. He is a being confident in his own strength and courage, conscious of his own worth, but not disdainful to others. Sure of his own superiority, and of the right which he assumes, he knows how to maintain them in everything of importance, and how to relax in matters of less consideration. Though the Cock reigns and rules like a bashaw over his harem, yet he is an attentive husband and a tender father. The females and their young are to him a people that must obey, but they must at the same time be governed with mildness. Their weakness and his strength secure submission on the one hand, and protection on the other. He desires no food for himself, but as much as will suffice to support his strength; and should he chance to meet with anything delicate, he touches it not, but calls his family around him, who answer immediately to the voice of their master who summons them, and of a husband and father who invites. His acquisition he shares between the mothers and the children, answering to their murmurs of gratitude by lower and gentler accents. His progeny are protected by his acting either on the defensive or offensive against every enemy that assails them.*

Neither is the female destitute of courage; should an enemy approach her when surrounded by her young, she will attack him with the spirit of a tiger and the courage of the Cock, though the intruder should be ten times her size and of proportionate power, and whether quadruped or bird.

It is not correctly known to which species we are indebted for the domestic poultry of our farm-yards; but it is generally believed that they are of a mixed origin, probably between the *Gallus giganteus* and *bankiva* (both natives of Java), on account of the domestic females bearing the greatest resemblance to those in a wild state, by the similarity of the form and structure of the feathers, and by the males of those possessing the greatest development of comb and wattles.

---

* British Cyclopædia.

The following description of the plumage of the Bankiva Cock is from that of Sir William Jardine, Bart., in the "Naturalist's Library." Around the eyes and the throat is bare; the comb is ample, with an irregular outline, and narrow lengthened lobes arise from the crown, and two wattles spring from the lower mandible. The head, back, and sides of the neck surrounding the bare skin upon the throat and the rump are covered with long hackles; the upper part of the back is bluish-black, and the centre with the lesser wing-coverts are of a rich deep chestnut; the webs of the feathers quite disunited. The greater coverts are steel-blue; the secondaries of the same colour, with a broad margin of chestnut; the quills brownish-black, edged with pale reddish-yellow. The tail is black, with rich green and blue reflections; the whole under parts are black.

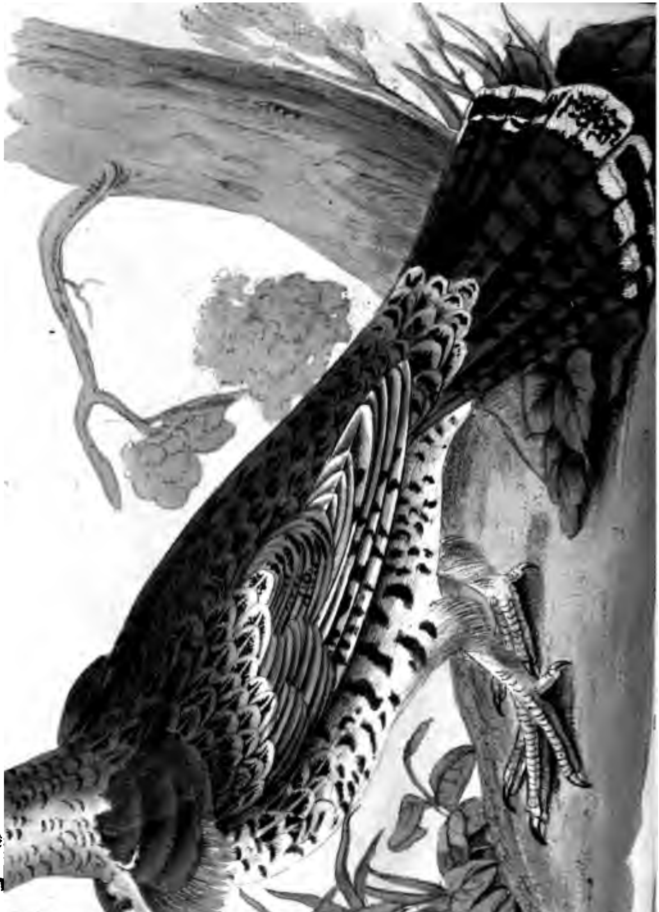
The Cock, in some of its varieties, was known at a very early period, but we have no traces which would inform us how it was introduced to Greece or Southern Europe. It made a figure at the public shows of the Greeks and Romans, who have preserved records of it upon their coinage, and in their mythology have dedicated it to Apollo, Mercury, Æsculapius, and Mars. At the Roman banquets it was also for a while a prominent dish; the finest were fattened in the island of Delos, whose inhabitants were proud of their successful feeding, and that island, with Rhodes, also produced the best and boldest at the public fights.

Grouse, Partridges, and Quails.

Our second sub-typical group, composed of the Grouse, Partridges, and Quails, displays, in some of its genera, a strong affinity to the birds which we have just left. They are distinguished from them, however, by the extreme shortness of their tail and of their hind toe; they are also remarkable for the total want of that brilliancy of plumage which so eminently characterises the last family.

The *Tetraonidæ*, or Grouse, contain the principal part of those birds which have generally been denominated *game*. Very few of them have been domesticated for the use of man, but in civilized countries laws have been enacted for their preservation in a wild state; and in the proper season they form a desirable addition to the luxuries of populous cities. They principally frequent the ground, but many of them frequently perch and roost on trees. As we approach the confines of the grallatorial order, the habit or capacity of perching is considerably diminished or altogether lost, and a greater facility of running is developed.

Some portion of these useful birds, says Sir William Jardine, are spread over every region of the world, and in almost all localities. The section of the Grouse to which the river fowl of Britain and the ptarmigan belong occupy the wild heathy districts of the temperate circle, and extend to the most barren and

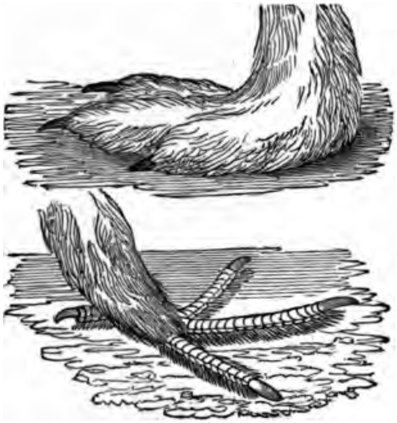


alpine mountains, or the extremes of polar cold. The true Grouse, again, to which the European Wood Grouse belongs, occupy the forests and the bushy grounds, and extend almost as far. The Partridges prefer open countries free from wood, and draw near to cultivation; but within the tropics there are one or two forms, which, like the Grouse, prefer the brush and wood, where, on the branches, they are safer from the attacks of the numerous tribes of reptiles which swarm around them. The Gaugas, again, or, as they have been named, the Sand Grouse, frequent the most barren districts in the world—the plains of India and the trackless deserts of Africa and Arabia—far from the haunts of man, and almost as far from food and water, but endowed with powers for extensive locomotion; they traverse in a day leagues of the waste.

A few species are polygamous, like the former family, the males at dawn seeking some eminence, and attracting the females by their continued calls, strutting around and displaying their plumage; but by far the greater number are monogamous, and regularly pair. The male remains near his consort during incubation, and both sedulously attend upon and defend the young, which keep together in coveys until the warmth of the following spring excites new desires, and causes their separation. All breed upon the ground, making scarcely any nest, and, with few exceptions, they lay a number of eggs. The plumage is subject to considerable variation between the males and females during the breeding season, and in those which inhabit northern regions or alpine districts, a change of plumage in winter, different from that of spring or summer, takes place.*

The only generic character which Cuvier mentions as applicable to the whole of these birds is that of having a band of naked skin over the eye; this band is generally of a red colour, and is more developed and of a brighter tint in spring than any other time.

Most of the birds of this family have the tarsi feathered; many of them have the toes as well as the tarsi feathered on the upper side, and others have the legs and toes completely covered with feathers on all parts, above, below, and between the toes. These last are inhabitants of the colder regions, and their feet are thus preserved from being numbed or otherwise injured by the intense cold of the snow in those climes. Grouse are also distinguished by having the toes pectinated, that is, fringed or furnished with rough prominences on their edges.



The generic term Grouse, or *Tetrao*, is usually restricted to those birds bearing the form of the European Wood Grouse, Dusky Grouse of America, etc.

---

* Nat. Hist. of Game Birds.

They are the largest birds of the family, and perhaps approach the nearest to the birds of the last in habits, as well as form and appearance. They are of a robust powerful form, and frequent heathy forests in preference to the wild and open muir; perch and often roost on trees where young shoots and tender bark also supply them with food; and although the legs are plumed with short feathers, the toes are naked. The tail is composed of broad feathers, and is proportionally long and rounded. They are mostly polygamous; and the females and young differ considerably from the males, the plumage of the former being shades of brown and tawny, with black bars and markings, the colours of the latter distributed in broad masses of black, glossy green or steel-blue, and deep brown. They inhabit North America and Europe, those of the latter country extending into Northern Asia.

One of the most splendid birds of the group, equally notable for its size and noble bearing, is the Wood Grouse, or Capercailzie (*Tetrao urogallus*); a species peculiar to the northern portion of the eastern continent.

The Capercailzie was at one time included among the birds that frequented the provincial forests of Scotland and Ireland. From the latter they appear to have been entirely extirpated at an early period; while in Scotland their destruction was more gradual, and they were only extirpated about seventy or eighty years since. There appears, however, to be some prospect of their being again introduced, and it is hoped generally dispersed over the wilds of that country. The length of the Wood Grouse is about two feet nine inches, and the extent of the wings about three feet. Its principal food appears to consist of the berries of the juniper, the vacciniums, and other small fruit-bearing shrubs of the high latitudes, and also of the buds and young sprouts of pines, and the buds of succulent leaves of various plants. The nest is constructed upon the ground; and the female lays about ten or twelve eggs, of a yellowish dirty white, sprinkled irregularly with yellow spots. The young, immediately on their extrusion from the egg, follow the mother with great agility in search of the pupæ of ants and other insects. At the expiration of about two months the young males forsake the nest of the brood, and live harmoniously together till the beginning of spring, when they separate, and affect solitude, never approaching but in the spirit of hostility.

As an article of food the flesh of the Capercailzie is much admired, and the London market is annually furnished with an abundant supply from Sweden, Norway, etc., so rapid is the communication between distant countries by means of the extraordinary development of the power of steam.

Wilson has admirably described the habits of the Ruffed Grouse (*Tetrao umbellus*), and a correct notion of the manners of these birds in their wild state cannot be obtained without reference to the results of his minute observation, or seeking out the birds in their native wilds, which it is the fortune of but few to be enabled to do.

This elegant species, says Wilson, is well known in almost every quarter of the United States, and appears to inhabit a very extensive range of country.

Its favourite places of resort are high mountains covered with the balsam pine, hemlock, and such like evergreens. It always prefers the woods, and is seldom or never found in open plains.

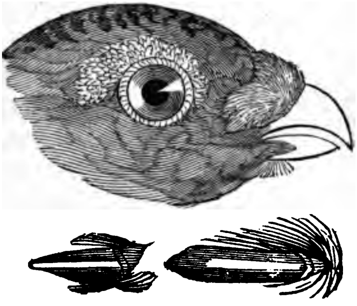
The manners of the Pheasant (as this bird is called in Pennsylvania and the Southern districts) are solitary; they are seldom found in coveys of more than four or five together, and more usually in pairs, or singly. They leave their sequestered haunts in the woods early in the morning, and seek the path or road, to pick up gravel and glean among the droppings of the horses. They generally move along with great stateliness, their broad fan-like tail spread out. In walking through solitary woods, frequented by these birds, a stranger is surprised by suddenly hearing a kind of thumping, very similar to that produced by striking two full-blown ox-bladders together, but much louder; the strokes at first are slow and distinct, but gradually increase in rapidity, till they run into each other, resembling the rumbling sound of very distant thunder, dying away gradually on the ear. After a few minutes' pause this is again repeated, and in a calm day may be heard nearly half a mile off. This drumming, as it is usually called, is most common in spring, and is the call of the Cock to his favourite female. It is produced in the following manner: the bird standing on an old prostrate log, generally in a retired and sheltered situation, lowers his wings, erects his expanded tail, contracts his throat, elevates the two tufts of feathers on the neck, and inflates his whole body something in the manner of a Turkey-cock, strutting and wheeling about with great stateliness.

After a few manœuvres of this kind, he begins to strike with his stiffened wings in short and quick strokes, which become more and more rapid, until they run into each other. This is most common in the morning and evening, though I have heard them drumming at all hours of the day.

The Pheasant begins to pair in April, and builds its nest early in May; this is placed on the ground, at the root of a bush, old log, or other sheltered and solitary situation, well surrounded with withered leaves. It is usually composed of dry leaves and grass. The eggs are from nine to fifteen in number, of a brownish-white, without any spots, and nearly as large as those of a pullet. The young leave the nest as soon as hatched, and are directed by the cluck of the mother, very much in the manner of the common hen. On being surprised, she exhibits all the distress and affectionate manœuvres of the Quail and of most other birds, to lead you away from the spot. I once started a hen Pheasant, continues Wilson, with a single young one, seemingly only a few days old; there might have been more, but I observed only this one. The mother fluttered before me for a moment; but suddenly darting towards the young one, seized it in her bill, and flew off along the surface through the woods, with great steadiness and rapidity, till she was beyond my sight, leaving me in great surprise at the incident. I made a very close and active search around the spot for the nest, but without success. Here was a striking instance of something more than what is termed blind instinct, in this remarkable deviation from her usual manœuvres when she has a numerous brood. To carry off a whole brood in this manner at once would have been impossible, and to attempt to save one at the expense of the rest would be unnatural. She therefore usually takes the only possible mode of saving them in that case, by decoying the person in pursuit of herself, by such a natural imitation of lameness as to impose on most people. But here, in the case of a single solitary young one, she instantly altered her plan, and adopted the most simple and effectual means for its preservation.[*]

In the winter, when snow is upon the ground, these birds will, if suddenly alarmed, dive into the snow, particularly when it has newly fallen, and, coming out at a considerable distance, again take wing.

The length of the Ruffed Grouse is eighteen inches. The plumage handsomely variegated with red-brown, yellowish-white, black, and white. The sides of the neck are furnished with a tuft of large black feathers, twenty-nine or thirty in number, which it occasionally raises; this tuft covers a large space of the neck destitute of feathers. The legs, which are feathered only half their length, and the feet pale ash; toes pectinated along the sides; the two exterior ones joined at the base as far as the first joint by a membrane; bill horn colour.



In the genus *Lagopus* the toes as well as the legs are completely covered with feathers, or rather rigid hairs. The hind toe of these birds is peculiarly short, and the claws long, and of a particularly flat, triangularly pointed form in the more alpine birds (the Willow Grouse, *Lagopus saliceta*, for example), to assist in digging or burrowing under the snow.

---

[*] American Ornithology.

It is well known that in winter the plumage of the common Ptarmigan (*Lagopus mutus*) is white, and in the summer yellowish-brown, delicately marked and mottled with black and grey. The change of colour as autumn advances is effected by a gradual disappearance of the markings upon the feathers themselves, and not, as is the case with most other birds, by a general moult or renewing of the feathers, which does not take place till spring with these birds. The black and brown colours give way first, and then the grey, till, by the time that the winter is confirmed, the whole bird, with the exception of the eye streak in the male, the outer tail-feathers, and the shafts of the middle ones, and the quills, become snow white. An increase of plumage, however, likewise takes place during this season, which, together with the properties inherent in the white colour of the feathers, affords a clothing eminently serviceable in preventing the vital heat of the body from evaporating too rapidly, and thus enabling the bird to dwell with comparative comfort amidst the dreary snow-clad summits of the mountains. As spring returns, the brown and black again make their appearance by a gradual process; but the change is now effected by the white feathers dropping off, and being succeeded by new ones, in their turn to become white, and to be exchanged again for others at the appointed time. This beautiful instance of the benevolent care of the Supreme Being towards the fowls of the air must strike every one. The winter plumage, which is of that texture and quality best adapted for the comfort of the bird, is assumed by degrees as the temperature of the air is lowered by the approach of that inclement season, and its colour is that which is best adapted for concealment as well as warmth in the midst of snow; in spring, when the bird can with greater safety part with its feathers, on account of the rising temperature of the atmosphere, the old feathers drop off, and are replaced by others, better suited to a warmer temperature as well as concealment among the then verdant herbage.

Birds of this family, it has been said, inhabit the barren sandy deserts of tropical districts, as well as the lofty mountain tops. These have been named Sand Grouse, and form the sub-genus *Pterocles.* They resort to the parched and arid deserts of Africa and Arabia, plains of burning sand, bounded only by the horizon, "where no palm trees rise to spot the wilderness," themselves almost the only living creatures, often proving a most welcome sight to those who, from necessity or avarice, attempt their dangerous passage. For abode in these deserts a more extended locomotive power is necessary, the distances to be passed from the different watering places being very great. We find the feet small therefore, formed for running lightly, the bodies more light and slender than most of the other birds of the family, and the wings lengthened, with the first quills longest, the tail also very long; thus showing an extent of development in the most important organs of flight far beyond any of the others. They are thus enabled to pass over vast distances, and they sweep over these wastes with an easy, noiseless, and extremely rapid flight.*

By means of the genus *Perdix*, comprising the Partridges, Francolins, Quails, etc., some species of which are destitute of the hinder toe, we are conducted to that of *Crypturus*, a very singular group of birds peculiar to tropical America, and called Tinnamon. They have scarcely any tail, their body is thick, and their whole appearance, says Mr. Swainson, reminds us of a pigmy bustard; which group they probably represent in the New World. They are distinguished by a slender bill, which is weak, lengthened, and as long as the head; the base of the culmen is broad and flattened; nostrils very long; the aperture naked; gonys excessively short; feet smooth; inner toe shortest. They particularly abound in the Brazilian and tropical forests, whose open glades they frequent during the day, and at night repose on the large branches of the trees, seeking safety from the numerous carnivorous animals which hunt their prey during night, and delight in the varied game of these wilds. During day they skulk about the long herbage, and even, when assailed by men, allow themselves to be killed with sticks, rather than exert their little powers of flight. Their wings are short and without power; but their feet are well fitted for running on the marshy grounds, and the disencumbrance of the tail enables them to thread an easy passage through a tangled herbage.

---

* Nat. Hist. of Game Birds: Sir W. Jardine.

Ostriches, Bustards, etc.

GRALLATORES.

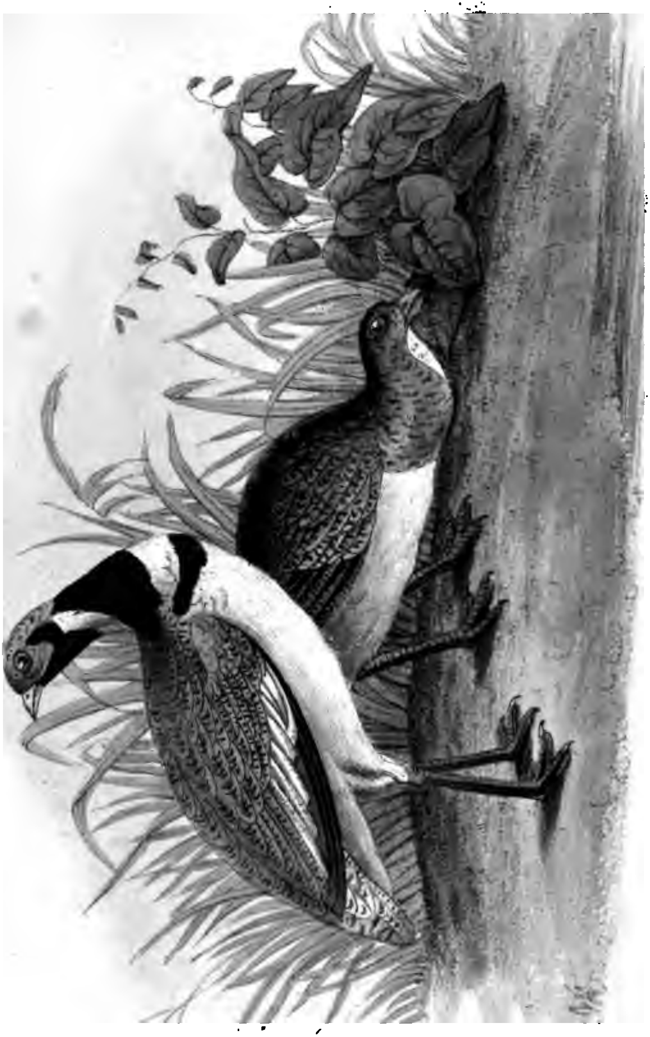
We now arrive at the most aberrant family of the Rasorial Order, which leads into the next great division of the class, the *Grallatores*, or Wading birds. The family which we have now to investigate, the *Struthionidæ*, or Ostriches, Bustards, etc., contains some of the most singular birds in the whole class: extraordinary they are as to their size, and the amazing power of their legs; the surprising speed with which they can run over an extended plain is no less wonderful than the extreme imbecility of their wings. In some of the species, wings appear of such little use to the bird that the rudiments merely of these members are apparent; and in others they appear solely as appendages for the display of ornamental plumes.

The Ostrich, the Cassowary, and the Emu are the three largest species of birds in creation; each of these, together with their prototypes, the Rhea and the Bustards, appears to vindicate, as it were, to itself a distinct portion of the surface of the earth. The Ostrich, Mr. Bennett observes, which is spread over nearly the whole of Africa, is scarcely known beyond the limits of the Arabian deserts; while the Cassowary occupies its place amid the luxuriant vegetation of the Indian Archipelago. The Emu is confined to the great Australian continent, and the Rhea to the southern extremity of the western hemisphere. And, finally, returning homewards, we find the Bustard, the largest bird of this quarter of the globe, receding, it is true, in some particulars from the typical form, but still fairly to be regarded as the representative of the family in Europe. Some species, however, belonging to the same group with this latter bird, extend themselves over a considerable portion both of Africa and Asia.*

The principal external characters, to use the words of the same talented naturalist, by which the birds just enumerated are connected together, consist in the absence of the hind toe, of which not even a vestige remains; in the length and power of their legs, which are completely bare of feathers; in the shortness of their wings, and their uselessness as organs of flight; in the length of their necks; and in their strong, blunt, flattened bills. The plumes of the more typical among them are distinguished by the want of cohesion between their barbs—a cohesion which in other birds is manifestly subservient to the purposes of flight, and which would therefore have been superfluous in them, which never raise themselves above the surface of the ground. Their food is almost entirely vegetable, and consists of seeds and fruits, or, rarely, of eggs and worms. Between the crop, which is of most enormous size, and the gizzard, which varies in thickness and power, several of them are furnished with an additional ventricle, analogous to the structure which prevails in ruminating quadrupeds. They occupy a station in some degree intermediate between the rasorial birds

---

* Gardens and Menagerie of the Zoological Society.



and the waders, approaching the latter in many particulars of their outward form, but much more closely connected with the former in their internal structure, in their food, and in their habits.*

Perhaps the nearest approach to the gallinaceous form among the birds of this family is exhibited in the genus *Otis*, the Bustards, although there are many points of difference both in the appearance, habits, and structure of these birds. The characters of the genus are these: they have the massive bodies of the gallinaceous birds, only their necks and legs are much longer in proportion. Like the *Gallinidæ*, they have the bill of a mean length, slightly compressed, a little arched in the culmen of the upper mandible, slightly incurvated at the tip, and projecting over the under one. They have also short membranes between the toes, in the same manner as the *Gallinidæ*, but they are without hind toes. Their tarsi are reticulated, that is, have the scales arranged like network. Their wings are short, for the size of the birds, and they do not fly much, unless when they are alarmed. Their ordinary march is on foot, and when they run swiftly they use their wings partially raised, for balancing themselves.

They live generally in open countries, preferring plains or wide-spreading extensive downs, dotted with low bushes and underwood, localities which give them an opportunity of descrying their enemy from afar.

There are several species, most of them inhabiting countries which are warm and temperate, and where they can range undisturbed. There is one species said to be still a resident in some parts of England, the Great Bustard (*Otis tarda*), and there is another, the Little Bustard (*Otis tetrax*), which occasionally makes its appearance as a resident.*

---

* Gardens and Menagerie of the Zoological Society.

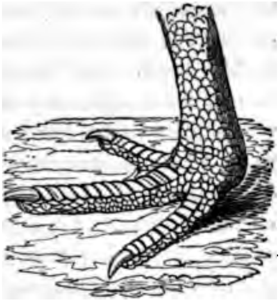
The Great Bustard (*Otis tarda*) is a noble bird, and is the largest of all the native birds, not only of the British Islands, but of Europe. The male bird, when full grown, measures no less than four feet in height, when the head and neck are elevated to their greatest extent; and it is not less than nine feet in the extent of its wings, so that they are somewhat in proportion to the size and weight of the bird. Its walking gait is erect and stately, and its running pace, in which it lowers the head and partially rows with the wings, is exceedingly swift.

In a wild state, Mr. Selby says, it is so shy as seldom to be approached within gun-shot; invariably selecting the middle of the largest enclosure, where it walks slowly about, or stands with the head reposing backwards upon the bare part of its neck, and frequently with one leg drawn up. Upon being disturbed, so far from running in preference to flight (as has been often described), it rises upon wing with great facility, and flies with much strength and swiftness, usually to another haunt, which will sometimes be at the distance even of six or seven miles.

The foot of the Bustard indicates the cursorial habits of the bird. It is long in the tarsus, and naked above the tarsal joint. The tarsus is about half a foot in length, the tibia is also long and comparatively free, and well supplied with muscle. At the lower end of the tarsus there is an elastic pad, which answers as a heel. The toes are so constructed as to give a spring to the foot when raised in walking, and to receive the weight of the bird when the foot is planted, without any concussion to the body.

---

* British Cyclopædia.



The plumage is rich in colour, and beautifully marked, the colours blending into one another with great delicacy. The head is silver-grey, with a well-defined streak of black along the middle. In the male bird there descends from near the angle of the gape, or rather from the ear-coverts, two pendent tufts of black silky feathers, which hang for eight or nine inches down the neck; these pendent tufts of feathers play backwards and forwards on the sides of the neck as the position of the head is shifted, and alternately display and conceal two patches of naked skin on the sides of the neck, which are of a violet colour. The lower part of the neck passes into a reddish-orange, of a rich but rather subdued tint. The ground-colour on the back is nearly the same, but it passes into greyish on the scapulars; and there is a greyish tuft of downy feathers at the setting in of the neck. The whole of the orange feathers are very elaborately streaked, barred, and mottled with black. The greater coverts of the wings and some of the secondary quills are of a dull black colour; but the primary quills are brownish-black, with white shafts.

The feathers of the tail have some white at their bases, and generally also at the tips; but the principal part of them is rich brown, with black lines, which form a regular band. The black markings in the feathers are in general regular crescents, with their convexity towards the point of the feathers, and a small line of the same colour running parallel to it. On the fore part of the neck of the male there is a membranous sac or pouch, having its opening under the tongue, and capable, when distended to its full stretch, of containing at least two quarts of liquid. This pouch is not covered with feathers, but with a naked elastic skin, of a bluish-black colour. There have been many conjectures as to the use of this pouch in the economy of the bird, but they are far from satisfactory, and the point remains undecided; it is not understood even to contain any liquid.* The female Bustard, which is not above half the size of the male, is without the pouch; and as, from his superior weight, the male bird cannot fly, unless with considerable difficulty, it is possible that he is thus provided with a receptacle of air to render him more light and buoyant in running.

The female does not make any nest, but drops her eggs, which are two in number, upon the bare ground. She sits close during incubation, and is not easily raised. The young also, on the appearance of danger, squat close down upon the ground, among the clods, which they somewhat resemble in colour.

In Norfolk, where only the birds are now found in England, observes Mr. Mudie, they frequent the large corn-fields in summer, and the turnip-grounds in winter. If the winter is severe they sometimes migrate near the coast, at which time they appear in little flocks. They are polygamous; but notwithstanding it is said there is a deficiency of male birds. They are much more abundant in some parts of France than in England, and in the dry wastes of the south of Russia, toward the Black Sea, they are still more plentiful.

---

* British Cyclopædia.

The American representative of this form is the Rhea, of which there is only one species, *Rhea Americana*, which inhabits the plains of Paraguay, and other parts where the ground is adapted for it. Its characters are: bill straight, of mean length, depressed; the tip bent down, and furnished with a nail. Nasal grooves large, extending to the middle of the bill. Legs long, very robust, and strong; toes three, directed forwards, the lateral ones of equal length; claws rounded, compressed, and blunt. Wings developed, but too short for flight, terminated by a single spur.

Of all the varied forms in the whole class of birds, that which now demands our attention is the most gigantic, and, as a bird, perhaps the most extraordinary and astonishing. The great muscular power which is developed in the frame of the Ostrich (*Struthio camelus*) is not applied to its functions as a tenant of the air; it is not in the wings, which we have hitherto found to be the principal limbs in which muscular strength and mechanical action were required for supporting the bird in its aerial excursions, that we discover any wonderful concentration of force and action; it is not in the sternal bones that strength is required; but it is in the legs that we find a concentration of the chief muscular powers of the bird. It is in the extraordinary speed with which it can run that the Ostrich finds its safety from attack; and it is the rigidity of its frame and internal organization that enable it to subsist where few other birds are seen. The Ostrich is the swiftest footed of all animals, and it is capable of carrying a heavy load upon its back; the weight of a man will scarce impede its progress. It is altogether incapable of raising itself from the ground, and lives habitually in the desert.

Of the differential characters, observes Mr. Bennett, which give to the Ostrich the rank of a genus, the most important is founded on the structure of its feet, which have only two toes, both directed forwards, and connected at their base by a strong membrane; the internal being considerably larger than the external, and being furnished with a thick hoof-like claw, which is wanting in the latter. The legs are covered with a rugged skin, reticulated in such a manner as to present the appearance of large scales; they are completely naked throughout, even in the muscular part, which, like the under surface of the wings, is bare of feathers, and exhibits a flesh-coloured tinge. The wings are each of them armed with two plumeless shafts, resembling the quills of a porcupine. Instead of quill-feathers, they are ornamented with graceful undulating plumes, and similar appendages terminate the tail. The long neck is covered on its upper half with a thin down, through which the colour of the skin is distinctly visible. The head is small in proportion to the magnitude of the bird, and is invested with the same kind of covering as the neck, except on its upper surface, which is bald and callous. The ears are naked on the outside, and hairy within. The eyes are large and brilliant, and so prominently placed as to enable both to obtain a distant view of the same object at the same time. They bear a remarkable similarity to the eyes of mammiferous quadrupeds, and have frequently been compared to those of man, which they also resemble in the breadth and mobility of their upper lids, and in the lashes by which these organs are fringed. The beak is short, straight, broad at the base, and rounded at the point, flattened from above downwards, extremely strong, and opening with a wide gape. The nostrils are seated near the base of the upper mandible, and are partly closed by a cartilaginous protuberance.*

The colours of the male are black and white, that of the female is greyish or ashy-brown. A full-grown Ostrich, when its neck is raised to its full elevation, measures about seven or eight feet in height. It has a stately gait, and a bounding elasticity in its step, which indicates rapidity of motion. But, notwithstanding its great size and strength, it is one of the most harmless and inoffensive of the whole race.

Ostriches are found in the greatest numbers, and of the largest size, on the margins of the great desert of Northern Africa; but they have a wide longitudinal range, extending wherever there may be suitable pasture for them, from the western extremity of the African desert, through the dry and naked parts of Arabia, Persia, and the Indian deserts, nearly to the banks of the Ganges. The Ostrich can subsist and delights to rove in places where no other bird could possibly exist, and where but for her a large portion of the surface of the earth would be a waste in nature, and therefore contrary to the general laws and provisions of the system. It is a bird of the desert, and well appointed to encounter the severe labour which such a locality must entail upon its inhabitants. It is appointed to course over the sandy desert, and as wings would comparatively be of little service in the situation in which it has been placed by nature, we find that the whole power of the bird, in so far as motion is concerned, is concentrated upon the legs and the muscles by which these are moved. The small development of wing-power in the Ostrich is therefore a beautiful instance of that economy which may be observed throughout nature. The wings of the Ostrich are, however, of essential service to the bird in its rapid progressive motion upon the ground; they assist considerably in preserving the balance of the body, and enable the bird to turn with greater facility than it could do without them.

---

* *Gardens and Menagerie of the Zoological Society.*

In the sternum of the wingless birds we observe a very considerable difference from that of the bird of flight, or even the rasorial bird. That of the Cassowary, like that of the Ostrich, is oval, without any keel, and bears some resemblance to the breastplate of a tortoise; and the coracoids, whose principal use is to support the bone, and preserve the form of the anterior part of the chest against the weight of the bird, the pressure of the atmosphere, and casualties, with*out having* any direct strain to bear when the bird is in motion, are short, broad, and flat. The outline of the sternum is very convex, with merely a trace of a keel at the anterior part, near the junction of the coracoids. The ribs are articulated far forward, and they are much thicker and stronger than in flying birds. There is not upon this bony structure any place where muscles capable of giving motion to a wing could be inserted. The strong articulation by the coracoids and the ribs, and the length of the scapulars which suspend the former, enable this form of bone, however, to give the most efficient support to the body, as a basket in which the thoracic viscera are carried; and its convex form renders it a most efficient breastplate against any external injury to which the bird may be exposed.*

The form of the foot, so different to that of any other bird, is well adapted to speed in running, and to the dry sandy surfaces of the desert tracts where these birds abound. The joints have little lateral motion, but the progressive motion is extensive, and the foot is lifted clean and high above the ground. The lower part of the tarsus does not touch the ground, as in the Emu and most other birds, but has somewhat the appearance of the heel of the camel; in fact, the foot as well as the whole bird, has no very distant resemblance to that quadruped in its habits and structure, both external and internal, so much so indeed, that the ancients looked upon it as partly bird and partly quadruped, and Pliny said that it might almost be regarded as belonging to the class of beasts.

The stomach of the Ostrich is a curious laboratory, and is capable of digesting the coarsest vegetable aliment; it will also act with powerful effect upon mineral and other hard substances, which the birds are in the habit of swallowing, with perfect indifference as to what may be their taste or smell.

---

* Mudie's Natural History of Birds.

The mode of incubation adopted by the Ostrich is also different to that of most birds. Several females, it is said, deposit their eggs so near together within a kind of nest or shallow concavity scraped in the sand, that they may often be considered as forming only one hatch; each female taking her turn in the incubation, and even the male bird has been sometimes seen to share in the labour. It is only, however, during the formation of dew and at night-time that the incubation of the eggs is required; the vertical rays of the sun strike with such powerful effect upon the dry sand of the desert, that the heat which is thereby produced is sufficient of itself to develope the vitality of the egg. The period of incubation is about forty days. The young are covered with a coarse mottled and striped plumage of blackish-brown and yellowish-white; the feathers of the back having the shaft dilated into a thin horny strip.

Grains and fruit are stated to be the food of the Ostrich in its natural state, but they will swallow almost anything that is not too large for their gullet; in confinement they have been known to swallow young chickens whole, and to trample hens to death in order to tear them in pieces; it is also stated that they will trample even sheep to death, so great is the strength of their legs.*

---

* Bishop Stanley's History of Birds.

We will not enter further into the peculiar habits of this bird, but glance at another genus of this singular family.

The Emu and the Cassowary form two genera of this family, the latter fine bird being the only example of its genus. It is a native of Java, Banda, Sumatra, and the Moluccas. The height of this bird when erect is about five feet. The internal structure of the Cassowary differs from that of the Ostrich in several important points. It is not indeed like that, a bird of the desert, though swift in motion and possessed of great power; its organs of digestion are adapted for soft fruits and tender herbage, rather than the reduction of hard and coarse food. In its native islands it is found sometimes tame, but neither in that condition nor in a wild state is it by any means abundant. Its mode of defence is peculiar; it strikes furiously with its feet, turning itself in an oblique direction, throwing its feet out backwards at its enemy. On the authority of Cuvier, we learn that it also strikes with its wing-shafts. It is bold and determined, but not intelligent. In size it is smaller than the Ostrich, but has a robust frame, and is very strong.

A third genus is composed of an extraordinary bird, inhabiting New Zealand, viz., the Apterix (*Apterix Australis*), the peculiarity of whose structure renders it almost an anomaly among birds. It has the lengthened bill of a grallatorial bird, with a foot resembling that of the rasorial birds, remarkably short and strong, yet not adapted for rapid progress upon the ground; it is much less adapted for progression in water; neither can the bird make its way in the air, being wingless. The feathers are loose and silky in texture, the whole of the fibres forming the web being disunited, and cover the body as a kind of thatch, well calculated for throwing off the heavy rains which fall in its native country, and their loose and flocculent nature makes them also a good protection against the heat of the sun during the dry season.

It is principally in the southern parts of the middle island of New Zealand that this bird is to be met with, though it exists wherever suitable localities afford it shelter; these are extensive beds of fern, among which it conceals itself. When chased, it takes refuge in the clefts of rocks, in hollow trees, or in deep holes, which it hollows out in the ground; these hollow places are the chosen spots for breeding, and lead to a deep chamber, in which the bird makes a fern-bed for the eggs, neither the number nor colour of which is, however, satisfactorily ascertained, nor have we yet any precise information as to the period or other circumstances of incubation.

The food of the Apterix, so far as it can at present be conjectured, consists of worms and insects, which it gathers from amongst the small stones and shallow crevices of the rocks of which the mountainous districts in which it is supposed to be most usually found are composed. Night is the season of activity, the Apterix being nocturnal in its habits. The inhabitants of its native land are accustomed to hunt it by torchlight; they value it greatly for the sake of its skin, which they prepare with the feathers on. Dresses made with these skins (which are singularly tough and firm) are valued highly by the chiefs, who can seldom be prevailed upon to part with them.

The wing is merely rudimentary, and completely concealed by the overhanging feathers. The bill resembles in form that of an Ibis, but is rather more straight at the base; it is six inches and three quarters in length from the gape to the point; the nostrils are situated on each side of the blunt truncated knob at the end or point of the upper mandible, and the aperture is continued, as a valve, beneath a covering membrane which traverses the whole length of the bill near the margin. On each foot there are four toes, the three anterior being entirely unconnected, and the inner and outer toes of equal size. A series of broad imbricated scales covers the upper surface of the toes. The claws are slightly curved, and taper gradually to a point, those of the middle toes are convex above, concave beneath; those of the inner and outer toes are also convex above, but the worn edges of the under sides give them a convex form beneath also, and they resemble a spur curved downwards. The hinder toe is placed on the inner flattened surface of the tarsus; it is directed backwards and almost perpendicularly downwards. The connecting bones are articulated so high upon the tarsus that the extreme point of the claw scarcely reaches the ground. The whole length of the hind toe is but one inch and an eighth, of which the claw measures three quarters of an inch. In form it has more the appearance of the spur of a gallinaceous bird than the claw of a hind toe.

The *decided rasorial* nature of the legs and feet, observes Mr. Yarrell, with the very elongated form of the beak, common to a different order of birds, thus combined in the Apterix, present considerations of the highest interest to the ornithologist; and it is to be regretted that little or nothing is known of the habits of a bird possessing parts and peculiarities of such distinct and different character.*

On dissecting a specimen of this interesting species, Mr. Owen found no trace of air-cells in the abdominal cavity, the diaphragm being entire, and pierced only for the transmission of the œsophagus and larger blood-vessels, as in the *mammalia.* The gullet is narrow, and the digestive apparatus adapted to small animal matter or insect food; there is no crop. The bones are not perforated, as in most birds, for the admission of air. The sternum is reduced to its lowest grade of development. In its small size and in the total absence of a keel, it resembles that of the struthious birds, but differs in the presence of two subcircular perforations situated on each side of the middle line, in the wide anterior emarginations, and in the much greater extent of the posterior fissures. All the leading modifications of the skeleton of the Apterix, Mr. Owen observes, connect it closely with the struthious group, so far as the natural affinities of a bird may be thus elucidated.†

---

* Transactions of the Zoological Society.

† Proceedings of the Zoological Society for 1838.

Plovers.

GRALLATORES.

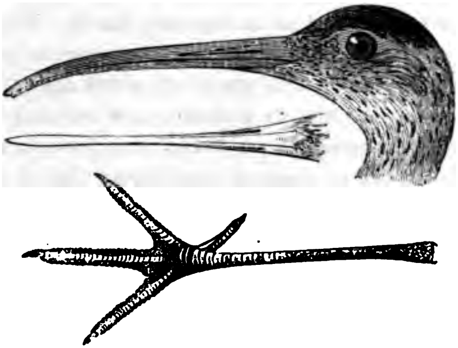
WITH the family *Struthionidæ* we closed the rasorial order of Birds; and although that most extraordinary form the Apterix was the last which engaged our attention, it cannot be supposed, however aberrant its characters may appear in its own family, that it displays any immediate affinity to the groups which we have now to investigate.

Unlike those of the last order, the grallatorial birds frequent places which are saturated with moisture, the shallows or the margins of waters where their peculiar food is to be procured, and which is often found beneath the surface. Their legs, necks, and bills consequently exhibit a modification of form in adaptation to such localities and food. It is their province to find subsistence among the variety of molluscous and other small animals that are cast upon the shore, or inhabit the mud and sand that are deposited by the waters and disclosed by the retiring tide, or the humid ground of low and marshy lands. As therefore their principal food consists of animal substances, they have membranous stomachs, and not gizzards, though some of them have a slight tendency to that character.

To enable these birds to gather their food without wetting their plumage, their legs are considerably lengthened, and they are more or less bare of feathers above the tarsal joint. The feet are adapted to various kinds of surfaces, to the softest ooze and the dry and arid waste, to the gravelly margin of the stream and the level sand on the sea-shore, to the marshy swamp and to the floating leaves of aquatic plants. The toes are generally very long, and the disappearance of the hind toe occurs oftener than in any other tribe. The typical structure of foot is found in the Sandpipers, Tringas, and Snipes. In these, the three anterior toes are very long, slender, and deeply cleft to their base, and the lateral ones not much shorter than the middle. Each of the toes is margined more or less with membrane. The hinder toe is much shorter, proportionally, than in the *Rasores*, and is placed rather higher up the leg. In the Phalaropes and Coots an approach to a swimming or diving foot is exhibited, in the expansion of the lateral membrane of the toes into lobes, or deeply scalloped membrane. The tarsus in all these birds is very much compressed or flattened laterally, so that only an acutely rounded edge is opposed to the water when wading in the shallows.

The bill of the Waders is in general long, and, in many species, flexible and sentient; in others it is of firm texture and sharp pointed, or short and stout: it assumes, however, a diversity of forms, in beautiful adaptation to the kind of food and the localities from whence it is to be procured. It is never shorter than the length of the head, but in some species it is four or five times longer; sometimes it curves upwards, and in other species it takes a contrary direction. Many of these birds procure their food by suction, and have a very narrow gape.

As an example of the form of bill and foot required by birds which resort to shallow waters or oozy shores, and obtain their food by probing the mud with their bill, we give those of the Whimbril *(Numenius Phæopus)*, a bird which is very generally found in all parts of the world.



To facilitate the ready motion of the lengthened neck, and the powerful action of the bill that is sometimes required, the bodies of most of these birds are poised with the direction of the centre of action immediately within the base formed by the feet, so that they can command a large portion of space with the point of the bill, while the axis of the body remains in nearly the same position.

During flight the legs are extended backwards, and as these birds have very short tails, they answer many of the purposes of that appendage. When the birds descend, the legs come down, and the centre of gravity is thereby thrown forwards, so that the bird in its descent would have a tendency to fall down head foremost were it not for assistance which wings now give to preserve the equilibrium of the body. The wings are so formed as to counteract this tendency. They are hollow on their under sides, especially towards the anterior parts, where all wings are stiffest, and thus they both take a much more buoyant hold on the air as a resisting medium, and produce a reaction to their stroke obliquely upwards and backwards; in consequence of which the bird is enabled to alight with the axis of its body in a more upright position than those birds which have not their wings so formed. In that way the birds can let themselves down very gradually, so as to feel no shock when they alight upon hard substances, or not to sink when they descend even with their greatest rapidity upon surfaces that are moist and soft.*

The *Grallatores* are rather wandering birds, migrating with the seasons. Occasionally they take very long flights, when they rise very high in the air. Their wings are accordingly adapted to quick and protracted flight.

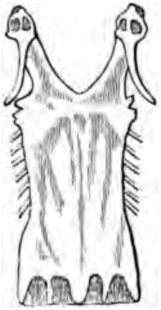
In the sternal apparatus of grallatorial birds we also find a modification of form suited to their habits. The general form of the body of the Waders is narrow in comparison with its depth; the sternum is consequently long and rather narrow, a little enlarged towards the posterior portion, and divided there by four notches of considerable depth, the lateral ones generally the deepest. The crest is usually large, convex below, and concave in front. The position of the coracoids, which are short and stout, is too parallel to each other, and too much in the general line of the sternum, for giving that stability to the shoulder-joint which is essential to long-continued and rapid flight. The scapulars are rather large, flat, straight for great part of their length, but bent downwards towards the points, so as to have a firm imbedment on the back.

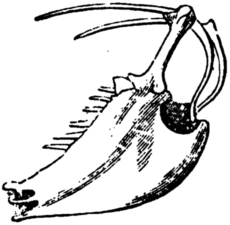
---

* Feathered Tribes of the British Islands.

The strength of the shoulder in these birds, as in the rasorial or ground birds, is not wholly, or even chiefly, based upon the sternum, but great part of it is connected with the back through the produced shoulder-bone, and being connected with the back, it is, by means of that, referred to the legs for support.

We give the sternal apparaus of the Lapwing Plover *(Vanellus cristatus)* (from Mr. Mudie's figure), which is a tolerably good runner, and also a ready flier, as nearly an average specimen of the whole.





Most of the *Grallatores* are gregarious during the winter months, and assemble in vast flocks. In the breeding season, with some few exceptions, they separate in pairs, many of them depositing their eggs upon the bare ground or sand, without any nest.

The families into which the wading birds have been divided are:—*Charadriadæ*, or

Plovers; *Scolopacidæ*, Snipes, Sandpipers, etc.; *Ardeadæ*, Herons; *Tantalidæ*, Ibises; and *Rallidæ*, Rails.

We have placed the *Charadriadæ* as the most aberrant family on the side of the previous order, as they appear to exhibit, in the tridactyle foot and many of their habits, a greater resemblance to some of the aberrant groups of the *Rasores* than any of the others. The Pratincoles, Couriers, and Thick-knees, as well as the Lapwing, are included in this family; the general characters of which are: bill short, rather slender, straight, compressed, with the nasal grooves extending two-thirds of the length, which renders the basal part of the upper mandible weak, and in part flexible. The nostrils are near the base of the bill, and pierced in and partly covered by membrane, which lines the groove to a considerable extent. The culmen is suddenly elevated and curved towards the tip. The tarsi are generally long and slender; toes, three in number, placed forwards, and united at their base by a small membrane; the hinder toe is usually wanting. First quill of the wings usually shorter than the second, which is the largest. Wings long, so that the power of flight as well as of running is very great. They live on sandy, unsheltered shores, or on exposed commons; they congregate in flocks, and are remarkably active and quick-sighted. Their heads are thick, and their eyes large, dark, and placed far back in the head.

In the summer months Plovers are chiefly inland birds, dispersing in pairs for the purpose of breeding. The place selected is generally on the margins of marshes and streams, in wild, unfrequented districts. The eggs are deposited on the bare ground, on sand, or amongst loose stones. After the broods are reared the birds assemble in considerable flocks, and descend from the breeding places on the moors, first to the low grounds, and ultimately to the beach, in countries where the winter is severe. There are, however, great differences among them in these as well as in other respects. Their flesh is of excellent flavour; but considerable caution is requisite to enable the gunner to approach within shot of them, as on the slightest appearance of danger the alarm-note is given, and the whole party are immediately on wing; as they fly remarkably quick, and double on the air with their pointed wings with the greatest facility, they are soon out of sight.

Plovers occur in almost all parts of the world. Their common English name is a corruption of the French "*pluvier*," or "rain bird," they being more active and noisy, like many other insect-feeding birds, during damp, rainy weather, than at other times. The worms and other molluscous animals which leave their hiding-places at these times in vast numbers is the cause of this more than ordinary activity amongst their destroyers.

The Courier Birds, or Couriers, forming the genus *Cursorius* of Temminck, or *Tachydromus* of Illiger, have characters so nearly allied to the last and to the present order, that the natural affinities of the group, whether tending to unite them with the Bustards or the Plovers, are by no means determined. There are four or five species which are natives of the deserts of Africa and the sandy districts of India. One species occasionally visits Europe, and has twice been shot in England.

The Thick-kneed Bustard, Stone Curlew, or Norfolk Plover *(Œdicnemus crepitans)*, appears also intermediate in character and habits between the running land birds and the more aquatic marsh birds which frequent the vicinity of water. In all countries which these birds inhabit, they are frequenters of dry and arid places. In Britain, they are found in such localities to the south and east of the island. They are migratory, generally speaking, though in mild winters a few of them remain all the year. They arrive in England in the early part of April; but a little sooner or later, according as the weather is more or less favourable. The eggs are deposited on the sand or earth, scraped or levelled a little by the feet; they are of a pale ashen-grey, with reddish-brown blotches. The male takes no part in the labour of incubation; but he remains all the time in the close vicinity of the nest, and while the female squats close on his giving the alarm-call, he uses his art to tempt intruders to a distance.

The feeding-time of these birds is in the dusk of evening or at early morn, as the large size of their eyes would appear to indicate. During the daytime they squat so close on the stony wild, and their plumage is so inconspicuous, that one may pass within a short distance of their seat without noticing them.

In autumn they assemble in flocks and continue feeding the greater part of the day. At that season they may, in the mornings, be surprised nearer the margins of the fields than at other times; but even then it is difficult to get near them, unless by surprise, and there is commonly one on the watch against that. Towards mid-day they are in the more open places, and if the sun is very hot they squat. They are noisy for even the greater part of the night; and if the weather is clear they roam about, and sometimes approach nearer the houses on the margins of those large downs and moors where they breed.

If come upon by surprise, the call is given by the sentinel, upon which they all elevate themselves to reconnoitre the danger, and then run off, always toward the bleaker and higher part of the pasture; but if the distance to the height is considerable, they will squat several times before that is reached, but always rising and running as they are approached. If hard pressed they take to the wing in any direction, and when followed to the top of the height, they take a longer and higher flight to the next one.

Though sober in its colours the plumage is pleasingly marked. The head, neck, and all the upper parts of the body are dull orange-brown, with a well-defined dusky streak down the middle of each feather; the neck and breast are of a paler shade of the same ground-colour, mottled in a similar manner; and the belly, thighs, and vent are pale yellowish-white. One streak of dull white above, and another under the eye, nearly form an oval boundary about that organ; and the chin and upper part of the neck in front are dull white, with a line of the same on each side, extending toward the nape, but not meeting behind, so as to form a collar. The quills of the wings, excepting a white bar across the first and second, to the tips of the tail-feathers, are black, and the remainder of the tail-feathers, which are short, and form a blunted wedge, are white. The tarsal joints, or knees, are remarkably thick, as if they were enlarged by gouty concretions, from which circumstance the bird gets its name.* The point of the bill is black; the basal parts of that member, as well as the orbits and irides of the eyes, and the legs, are yellow, the former of a paler shade than the others. The claws are black. The whole bird is about a foot and a half in length, two feet two inches in the extent of the wings, and upwards of a pound in weight.

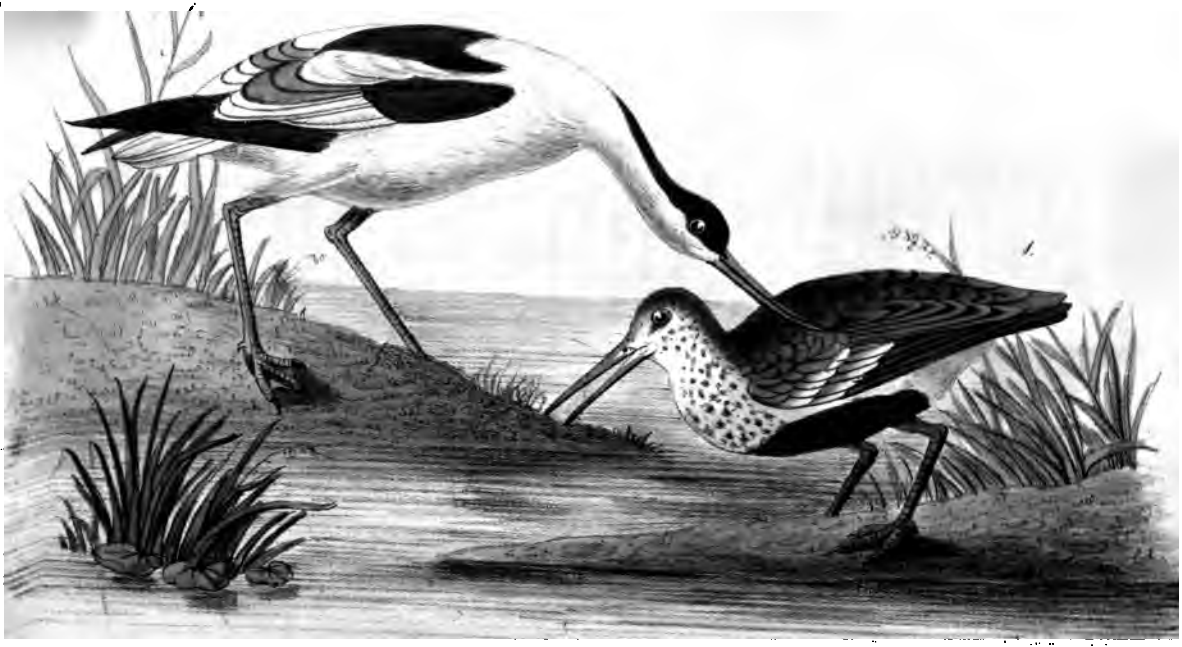
Of the true Plovers *(Charadrius)* we have two elegant little species on the British coast. One of these, *Charadrius hiaticula*, or Ring Plover, is to be seen on our flat shores generally throughout the year, running along the sand or shingle with great rapidity, and when disturbed uttering a plaintive whistle, which is often the only vocal sound to be heard on the lonely beaches during summer, as this bird is the only kind that at that time frequents the open shores. The Ring Plover drops its eggs, which are four in number and arranged quatrefoil, upon the bare surface of the sand, just above high-water mark. There is not the least appearance of a nest, and during the sunny hours of a summer's day the eggs are uncovered, but at night and during wet weather the female sits. When surprised upon her eggs she practises various manœuvres to attract attention away from the spot where they may be deposited; she runs, and turns, and doubles, drops a wing, feigns lameness, alternately running and flying, uttering a twittering sort of complaint; and when at length she has effected her object of luring the intruder away sufficiently far from the precious spot, she darts off in a contrary direction, and flies back again to her eggs. The birds pair in April or early in May, and by the time that the young are hatched, hosts of insects are be found along the line of high-water mark, and on the sands. The parent birds and their broods remain for some time together; but as the season advances they assemble in small flocks, and during winter associate freely and peaceably with many others of our littoral birds.

---

* Mudie's Feathered Tribes.

This species is about seven inches in length, and sixteen in the extent of the wings; its weight is about two ounces. The basal part of the bill and the legs are yellow, the former approaching to orange. The tip of the bill is black; the claws are of the same colour. The crown and back part of the head, back, and wing-coverts pale silvery brown; under parts, a line across the forehead, the chin, and throat white, which colour is continued round the neck, and passes in a streak over the eye. At the base of the upper mandible the feathers are black, which colour passes in a broad streak under the eye, taking in the coverts of the ears. A broad black band or gorget of black encircles the breast, and meets in a narrow stripe at the junction of the hind neck and the back.

Wilson, describing the habits of the Kildeer Plover (*Charadrius vociferus*), an American species, says that, although not over particular in the construction of its nest, which is a mere hollow in a dry sandy spot, it lines the same with any materials that are most conveniently come at, such as bits of sticks, straw, pebbles, or earth. Indeed, in some instances, he says, it has been found to dispense with a nest altogether, and to bring forth its progeny on the bare ground. During the breeding season, he continues, they exhibit much anxiety and alarm for the safety of their progeny. At this season they may be seen, now floating about high in air, now approaching the surface of the earth, then skimming the surface of the ground, then limping about on one foot as if they were lame, the while uttering the most clamorous, piteous, and incessant cries of *Kildeer, Kildeer.* The instant a person approaches, his ears are assailed with a continuous strain of this harassing noise; and if his object seems to be to search out the nest of the bird, the birds flutter about near to his person, continuing this annoyance till he is generally obliged to abandon his search. On these occasions they betray much cunning in never alighting near the particular spot where the nest is placed. In the spring and fall of the year these cries are often heard in the night, more especially in moonlight nights; and from the circumstance of their flying abroad in the dark, it is probable that they see better at these times than most of their tribe. Worms are understood to be their principal food; and as there is a species of them which rises to the surface of the ground during the night, it is extremely likely that this is their chief inducement to be about at this season. This Plover is a little larger than the one just described, and its colours and markings a little varied, though somewhat similar to those of the ring-necked species.

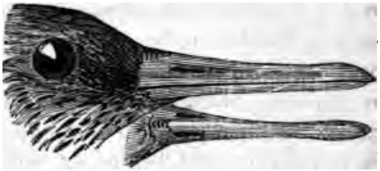


Nº 1 The Purre or Dunlin.
2. The [illegible]

Sandpipers, Snipes, etc.

Next to the Plovers we find the *Scolopacidæ*, a family containing the Sandpipers, Snipes, and others; a numerous and diversified group. Many of the individuals have remarkably long and sentient bills, which are slender, soft, and cylindrical in form. Most of the pecies have four toes, but the hallux is usually very mall, and elevated above the others on the tarsus. he Turnstone (*Strepsilas*) and the Curlew (*Numeius*)—the former at once recognised by its short, tout bill, and the latter by the length, strength, and urvature of that member—are included within this mily.

In the Ring-necked Plovers we observe the form ad modification of foot best adapted for running on e firm or gravelly surfaces which the sandy shores the sea-coast present; we have now to examine the eculiarity of structure required in the feet and bills those birds which resort more habitually to the ft mud or sludge which the retiring tide discloses the mouths of rivers, estuaries, or other places here floods have rendered the earth soft and yielding. is in such places that the Tringas find their food; d as they are somewhat dependent upon the tide r their supply, they are gifted with powerful flight, at but little time may be lost in their passage from e feeding-place to another. The bill of the Tringas



is longer than that of the Plovers, being as long or longer than the head, generally straight and soft and flexible for its whole length, except towards the tip, which is slightly dilated and smooth. Both mandibles are channelled as far as the tip; and they appear to be sentient throughout. The nostrils are pierced in the grooves at the base of the upper mandible. The tarsus is of moderate length, but longer than the middle toe; the anterior toes are either cleft to their base, or united by a slight membrane; they are flattened and bordered by a marginal membrane, so that the under side of each toe opposes a flattened surface to the yielding mud. The hinder toe is very small, and articulated on the tarsus above the junction of the others; in some species it is altogether wanting. They are remarkably quick-footed, and their motion is smooth and graceful. Their wings are pointed and powerful, so that they can dash onward for a considerable distance in rapid flight, and also wheel and double with much ease. Mudworms and other molluscs, which abound in the places they frequent, form their food, and their flesh may be considered a dainty.

One species of this genus is seen abundantly along our shores during the winter, not unfrequently associating with the Ring Plovers on the sands at low water. It is *Tringa variabilis*, the Purn, Dunlin, or Oxbird, as it is usually called in the South, and is remarkable for its ever-varying plumage. The winter dress is very different in colour to that which it appears in during summer. At the former period the top of the head, back of the neck, scapulars, and back are ash-grey, tinged with brown, the shafts of the feathers dusky, inclining to black. The coverts of the wings dull blackish-brown, with brighter brown margins; the tips of the greater ones white. The feathers on the rump and upper tail-coverts dusky, with brownish margins; the middle tail-feathers, which are the longest, dusky brown; the others grey, with whitish shafts and edgings, the lateral ones being longer than the intervening ones, though not so long as the middle tail-feathers. A brownish line extends from the gape to the eye, and thence backward there is a streak of dusky white. The chin and throat, under parts of the body, and under tail-coverts, white; front of the neck and breast grey, with brown shafts to the feathers. The bill, legs, and quill-feathers dark dusky brown; the shaft of the first wing-quill white.

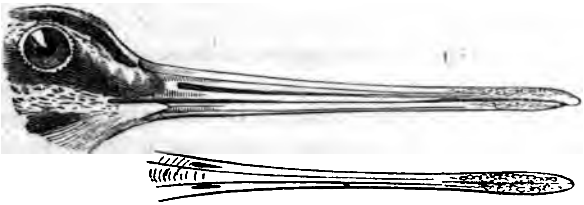
In summer, the crown of the head, back of the neck, scapulars, and upper part of the back become black, with reddish-brown margins to the feathers; the rump and tail-coverts, brownish-black; cheeks, fore neck, and breast black or dusky brown, with white margins to the feathers. The chin, belly and vent, and under tail-coverts white, as well as the flanks, which are streaked with longitudinal lines of dusky brown. The quills and coverts are nearly the same at all seasons. The first plumage of the young birds is intermediate between the winter and the summer plumage of the adults; but it fades into the pale colour in the winter, and regains the darker shades against the next summer. Some of the species have the under parts, from the breast, more or less blackish.

The length of this species is from seven to eight inches, and the stretch of the wings is very nearly double the length of the bird. The bill is about an inch in length, slender, and slightly bent downwards towards the point, which is faintly marked by numerous small indented spots, in a similar manner to that of the Snipes.

In winter these birds are seen in small parties, following the tide on the oozy shores and banks of the lower estuaries near the sea. When undisturbed they are occasionally observed to run very swiftly, uttering a sort of murmuring note; but on the approach of any person, they take to flight with a querulous and wailing scream. In the breeding season they are in single pairs. The nest, as we learn from the Linnæan Transactions, is composed of dried tufts of sprit or heath-rush (*Juncus squarrosus*); and the eggs, which are four in number, are of a smoky white, irregularly marked with light and dark brown blotches, rather more distant at the smaller end.

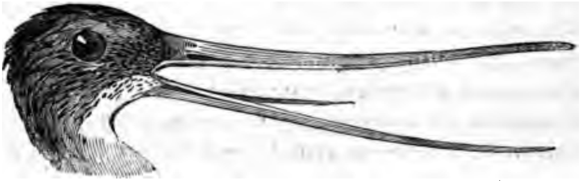
These birds are also found in Greenland, Iceland, and Scandinavia, and on the Siberian Alps, as well as at Hudson's Bay, and other northern shores.

It is in the genus *Scolopax* that we find in the bill the most perfect instrument for probing soft earth in search of worms and aquatic insects, which are the food of the birds. The form of the head is also peculiar, and the peculiarity is of course adapted to the action of the bill. The head is square in the profile, and extends over the base of the bill in all directions; so that whatever way the bill may work in the ground, the weight of the head is ready to assist it in its lateral twistings, as the animal bores into the sludge. The eyes are placed much further backward than those of most birds, which enables the bird, in all probability, to guard against surprise by an enemy, when thus busily engaged in search of food. The bill is very much lengthened, straight, and slender, blunt at the tip, with the upper mandible terminated by a knob on its under side, and projecting beyond. The tips of both mandibles are roughened by numerous indented spots. The nasal grooves extend nearly the whole length of the upper mandible, and the nostrils are narrow longitudinal slits, covered by membranous valves. The bill is copiously supplied with nerves, and highly sentient. The middle toe of these birds is much longer than the tarsus, and the hallux is but slightly developed.



Snipes are natives of the northern portion of the globe, but are driven southward as the ground begins to freeze, and the swamps and marshy lands are dried up. They are quiet, retiring birds, inhabiting moist places where water partially stagnates. They either live in concealment among the rank herbage of marshy places, or conceal themselves during the day in the woods, and come abroad to feed in the dusk or during the night.

Another genus in this family is *Limosa*, comprising the Godwits. The bill is of considerable length, and slightly recurved or turned upwards; it is soft and flexible for its whole length, rather compressed and triangular at the base, depressed in the rest of the length, and somewhat dilated and obtuse at the tip. This instrument is used for probing the ooze and sand in search of worms, mud-insects, and their larvæ. These are drawn out from beneath the surface by a peculiar muscular power, which, by closing the upper part of the mandibles, operates so as to expand them at the point, and the bird is thus enabled with the bill still buried in the mud to seize its prey the moment it is aware of being in contact with it. The places which abound most plentifully with this food are those to which the Godwits resort—the banks in the eddies of slow-running streams, or the accumulations of sludge that are left bare in the estuaries and creeks



upon low and rich land on the ebbing of the tide, and especially the runs of mud from the richer grounds into the pools of fens, are the favourite places with these birds. They are all birds of passage, shifting from one region to another as the seasons alter the character of those places in which they find their food; but should there be the requisite quantity of moisture in countries which are perennially suited to their habits, they remain all the year without migrating. They breed in the marshes, a considerable way inland, if the situation suits them; but in the winter they descend nearer to the seas, and may be met with in the oozy bays and estuaries, though not decidedly in the salt water. When inland they conceal themselves among the aquatic plants, in which they nestle; and when they come to the sea, they are abroad only at those times when the state of the tide is favourable for their very peculiar mode of feeding. The mornings and evenings are the times at which they are most upon the alert, and then they may occasionally be seen running about with great velocity, and poking in the soft and moist earth for those little creatures upon which they feed. They are, however, better known by their cry, which is shrill and peculiar, and bears some resemblance to the bleating of goats.*

Audubon thus describes the habits of the great marbled Godwit of America (*Limosa fedoa*). This fine bird is found during winter on all the large muddy flats of the coast of Florida that are intermixed with beds of the racoon oysters. As the tide rises it approaches the shores, and betakes itself to the wet savannah. At this season it is generally seen in flocks of five or six, searching for food in company with the Tell-tale, the Yellow-shanks, the Long-billed Curlew, and the White Ibis. While feeding it probes the mud and wet sand, often plunging its bill to its whole length, in the manner of the common Snipe and the Woodcock. It is fond of the small crabs called fiddlers, many of which it obtains both by probing their burrows and running after them along the edges of the salt meadows and marshes. Sometimes you see it wading in the water up to its body; and when about to lose ground, it rises and extends its wings, still continuing to search for prey until forced to fly off by the increased depth of the water, when it alights on the shore, and recommences its operations. While feeding on the banks it appears to search for food between and under the oysters with singular care, at times pushing the bill sidewise into the soft mud between the shells. Towards the middle of the day the separate flocks come together, assembling on some large sand-bar, where they remain for hours trimming their plumage, after which many of them continue some time motionless, standing on one leg. Suddenly, however, they are all seen to stretch their wings upwards, their bleating notes are heard, and the next moment the flock rises, and disperses in small parties, each of which proceeds in a different direction in search of food.

---

* British Cyclopædia.

The Avocet (*Recurvirostra*) and the Long-shanks (*Himantopus*) have been placed in this family, and their peculiarities are too striking to allow of their being passed by without observation. The former genus, of which there are four species at present known, is remarkable for the very singular form and curvature of the bill; and the bird itself, as Mr. Mudie observes, is one of the most beautiful instances of adaptation in the whole range of animated nature. Pennant well describes the Avocet's bill as very thin, flexible, and of a substance like whalebone. Buffon makes it the subject of one of his lamentations upon the errors of nature, and her niggard disposition in providing for some of the less favoured of the animal creation. But in truth no organ could have been devised more admirably adapted for the function which it has to perform than the bill of the Avocet, as he who has seen the bird scooping, probing, or apparently patting and beating the water and soft mud with it, while the mandibles act as a strainer and retain the prey, will readily acknowledge.

This bird is of considerable size, measuring about eighteen inches in length from the tip of the bill to the end of the tail; the extent of the wings when expanded is about two feet and a half. The length of the bill, measured along the curve, is about three inches and a half. The body is handsomely formed; and the plumage, which is remarkably close and glossy, is generally pure white and black, which increase the apparent intensity of each other by their contrast, and give to the bird a very clean appearance. The legs are very long, but they are proportionally strong and well jointed, and they are so well adjusted to the centre of gravity, that the birds walk in a firm and stately manner, and have great command of themselves. The hind toe nearly rudimental; those in front well formed, firm, and elastic, so that the bird can rise upon them as springs, when such a movement is necessary; they are half webbed; but the webs extend in straight lines to the roots of the claws, rendering the foot well fitted for walking upon soft and oozy surfaces, or upon surfaces having different degrees of softness.

By means of its long legs, and the nakedness of its tibiæ, the Avocet is enabled to wade to a considerable depth without wetting a feather. The tarsi are also well adapted to this habit, for they are compressed laterally, and present but a thin edge in front, so as to offer hardly any resistance to the medium through which they have to make their progress. The feathers of the head, neck, and under parts of the body are similar to those of water birds, so that they would sustain no injury should they be immersed in water.

It is the bold upward curve of the bill that constitutes the most singular character of the bird, and one is apt at first sight to consider it an awkward contrivance, and unfit for any useful purpose; but as there is no awkwardness or unfitness in any portion of nature's works, there can be no doubt that the form of this bill is that which is adapted in the best possible manner for the peculiar function it has to perform.

Avocets are fen birds; but, in feeding, they frequent only those parts of the fens which are alternately flooded and left dry by tidal waters, or the small water-courses which discharge their contents immediately into them. Their bills are not adapted for catching any kind of food on land, neither are they fitted for fishing in the waters. Both land and water are therefore cut off from them, and retained as the preserves of other races. Even the common soft sludgy ground of the marsh, into which the Snipes and Woodcocks bore for food, is a forbidden pasture to the Avocet, as its bill is not adapted for boring. It is in the little runs that trickle along the hollows, after the main body of water has receded from the general surface, that the Avocet finds a rich and plenteous pasture. The number of living creatures, or of creatures ripening into life, which is contained in the mud, ooze, or light gravel of these is immense; worms and larvæ, and small molluscous and crustaceous animals are in great plenty; and the myriads of the spawn of fishes in their seasons (and as these vary they extend over a considerable portion of the year), together with the young fry of the same, are beyond all the powers of arithmetic. The greater number of these are imbedded to a small depth, and those that are not get rolled along by the moving sludge and partially covered by it.

These accumulated matters, which are not seen by birds which feed by the sight, and are not stationary enough for being either bored or dabbled for, are the harvest of the Avocet; and the way in which it avails itself of that harvest has some resemblance to reaping, or rather perhaps to mowing. It moves along the run with slow but rather lengthy steps, and scoops the ooze or mud in curves, right and left, as it proceeds. The traces of its scoopings may be seen by any one *who happens to* come to the place where it has been feeding before the tide rises to efface them; but the bird itself is so shy and wary that it can be seen by those only who, themselves concealed, have patience to watch for it. In scooping, it does not use the bill only, but the whole body, and as the fixed point from which the action is delivered is the foot, it has a wide swing; while, as the exertion is divided among so many acting parts, it can continue it for a long time without fatigue.

The middle line of its operation is the centre of the run or small water-course, or hollow, in the ooze of the flat beach, as it may be; and it plays or swings upon that as it moves along. In order to have a more perfect understanding of its operations, we shall suppose that it arrives on the wing, from its nest or other resting-place, and alights at the lower part of the run. It of course prefers proceeding against the stream, where there is running water, because the current is always bringing food to it, and also assists it in the capture. It alights in the middle with its head to the stream, and the one foot a little in advance of the other. This position of the feet throws the action of the body obliquely across the stream, with the head inclined to the side on which the foot is furthest in the rear. It then stretches and depresses the neck, and gives it a twist, so that the extremity of the bill, which is on a level with the ooze, is turned to the other side. The foot furthest in advance is the pivot upon which it is to turn in making the stroke which scoops one curve. Then it slowly advances the rearmost foot, which elevates the hinder part of the body, depresses the fore part and throws the support on the advanced foot; while, supported upon that, and moved by the lever power of the other as it is brought forward, the axis of the body is brought to cross the run obliquely in the opposite direction to the position at commencement; by this motion the bill is made to scoop a curve from that side of the run where the foot was in the rear at starting, to the opposite side; and by the time that that foot has moved the length of its half stretch in front of the other, and been planted, the fore part of the body is elevated and the hind part depressed, so that the bill is raised to the surface of the ooze by the action of the body alone. The head and bill are then elevated a little, for the purpose of conveying to the gullet the food which the bill may have taken in the scoop.

In this way the feet are advanced alternately, and the bill at each movement scoops its curve in advance of the moving foot; that is to say, from the side on which the foot is moved to that on which the planted foot is the centre of motion; of course, the scoops are alternately in opposite directions—from left to right when the left foot is moved, and from right to left when the right is moved. In this way the bird advances up the run, scooping alternately left and right, with ease, with effect, and even with a grace almost unparalleled in the action of birds.*

These birds are of conspicuous plumage, and have no weapons of defence, seclusion is therefore necessary for their safety: they consequently resort to extensive fenny districts; but when these are drained and taken into cultivation, the birds are driven from their haunts to places where they are less likely to be disturbed.

---

* British Cyclopædia.

One species, *Recurvirostra avocetta*, although rapidly disappearing, is still found in some parts of the fenny shores of England; breeding on the borders of the marshes. The eggs are understood to be four in number, and placed quatrefoil, or in the form of a cross; they are large for the size of the bird, and of an olive-brown colour, marked with spots. In the breeding season the birds are more easily seen, as, on approaching the locality of the nest, the female in particular flies round the head of the intruder in its solitude, playing in circles, and uttering incessantly the cry of *quheet, quheet.* She will also run, and limp, dropping one wing occasionally, as if it were broken, to induce the visitor to follow her away from her eggs or young brood.

Avocets are widely distributed, and in some places they are very abundant; one species belongs to Europe, another to Asia, a third to America, and a fourth to New Holland.

Peculiar as is the appearance of the Avocet from the curvature of the bill, the surprising length and pliability of the legs of the Stilt, or Long-shanks (*Himantopus*), renders this bird quite as remarkable and singular in its general character. The great elongation of the legs appears incompatible with the comparative shortness of the bill, and their pliability and slender proportions appear to render them but ill adapted to the usual functions of those members. By referring to the pages of those naturalists who have witnessed their actions and described their habits, we shall find in what manner they become effective instruments of progression, and what is the particular end attained by such a peculiar modification of form.

These birds, of which there are only three species known, are inhabitants of desert, sandy places near the banks of rivers and the shores of salt lakes; they are gregarious or social in their habits, occurring in flocks, which, from the arid nature of the places they inhabit, are rather discursive and often on the wing.

The species which is found in Europe, *Himantopus melanopterus*, is very rarely seen in this country. On the Continent it is much more common. It is found in all the other quarters of the globe.

Wilson, describing the habits of an American species, *Himantopus mexicanus*, says that this species arrives on the sea-coast of New Jersey about the 25th of April, in small detached flocks of twenty or thirty together. They are seen wading the pools or ponds of the salt marshes, which abound with minute shell-fish and multitudes of aquatic insects and their larvæ, besides the eggs and spawn of others deposited in the soft mud below. They breed in small societies in the neighbourhood of these places. While the females are sitting, the males are either wading through the ponds or roaming over the adjoining marshes; but should a person make his appearance, the whole collect together in the air, flying with their long legs extended behind them, keeping up a continual yelping note of *click, click, click.* As they frequently alight on the bare marshes, they drop their wings, stand with their legs half bent and trembling, as if unable to sustain the burden of their bodies. In this ridiculous posture they will sometimes stand for several minutes, uttering a purring sound, while, from the corresponding quivering of their wings and long legs, they seem to balance themselves with great difficulty. This singular manœuvre is, no doubt, intended to induce a belief that they may easily be caught, and so turn the attention of the person from the pursuit of their nests and young to themselves. They seldom raise more than one brood in the season, and depart for the south early in September. As they are well known in Jamaica, it is probable some of them may winter in that and other of the West India islands.

The length of this species, from the point of the bill to the end of the tail, is fourteen inches, to the tip of the wings, sixteen—extent, twenty-eight inches; bill three inches long, slightly curved upwards, tapering to a fine point, the upper mandible round above, the whole of a deep black colour; nostrils an oblong slit, pervious; tongue short, pointed; forehead, spot behind the eye, lower eyelid, sides of the neck, and whole lower parts, pure white; back, rump, and tail-coverts also white; tail even, or very slightly forked, and of a dingy white; the vent-feathers reach to the tip of the tail below; line before the eye auriculars, back part of the neck, scapulars, and whole wings deep black, richly glossed with green; legs and naked parts of thighs a fine pale carmine; the latter measures three, the former four inches and a half in length, exceedingly thin, and so flexible that they may be bent considerably without danger of breaking. This thinness of the legs enables the bird to wade with expedition, and without fatigue, as it is proportionally light, and yields, in a certain degree, to any object that it may come in contact with in the water. The feet are three-toed, the outer toe connected to the middle one by a membrane; wings long and pointed; irides a bright rich scarlet. In some the white from the breast extends quite round the neck, separating the black of the hind neck from that of the body. Claws blackish brown.* The female is considerably smaller than the male. The stomach is strong and muscular, a true gizzard in fact; and it is probable that, besides the shelled mollusca and coleopterous insects that it gathers from the aquatic plants on the surface of the water, it also may feed on vegetable substances procured in the same localities.

A very peculiar genus is formed by the Flamingos (*Phœnicopterus*), which appears to belong to the present family. They have, however, been arranged by Mr. Swainson, and other naturalists of the present day, among the swimming birds, the former considering them the grallatorial type of the *Anatidæ*. They were admitted by Cuvier into the grallatorial order, who describes them as the most extraordinary and most isolated of all birds.

The peculiar form of the bill, the extraordinary length and tenuity of the neck, and the no less lengthy and slender legs, with their palmated toes, together with the deep scarlet colour of the plumage, are sufficient to excite astonishment, and our curiosity tongue is not muscular, but is chiefly composed of an abundant, yielding, cellular substance, with fat of an almost oily consistence. It is supported by a long and thin concave cartilage, articulated to the body of the *os hyoïdes* by a shallow ginglymoid joint, allowing of a free motion. The gizzard is small, but strong and muscular, and it is therefore probable that vegetable substances form a portion of its diet, which the laminated edges of the mandibles may enable it to gather.

---

* American Ornithology.

M. Temminck says that the Flamingos live on the sea-beach or in marshes formed by salt lakes, where their food consists of testaceous molluscs, marine insects, and the spawn of fish, which they collect by plunging their long neck into the water, and turning the head upside down, so as to employ with greater advantage the head of their bill. Cuvier says that, in capturing their food, they turn the head on one side to give more effect to the hook of the upper mandible.

The general colour of the plumage of these birds is red or scarlet, of greater or less intensity, the quill-feathers of the wings being black.

In all places of the world where Flamingos are met with, they are highly interesting and characteristic birds; their great extent, their singular shape, their brilliant colours, and the sunny skies under which the generality of them sport over the broad waters, are all calculated deeply to interest and highly to gratify the observer of nature. They are, generally speaking, birds of warm climates and rich places, but they are not wholly confined to regions within the tropics. They do not appear, however, in any case to range more polarly than about the fortieth degree of latitude. They are common on the African coast, and the islands adjacent to the Cape of Good Hope, and sometimes on the shores of Spain, Italy, Sicily, Sardinia, and even at Marseilles, and some way up the Rhone, but rarely in the interior of the continent of Europe, and seldom on the banks of the Rhine. We trace them on the Persian side of the Caspian Sea, and thence along the western coast as far as the Wolga. They breed abundantly in the Cape de Verd islands, particularly that of Sal, constructing on the sea-shore, but so as not to be flooded by the tide, a nest of mud, in the shape of a pyramidal hillock, with a cavity at the top, in which the female generally lays two white eggs, of the size of those of a goose, but more elongated. The structure is of a sufficient height to admit of the birds sitting in it conveniently, or rather standing astride, as the legs are placed one on each side, at full length.

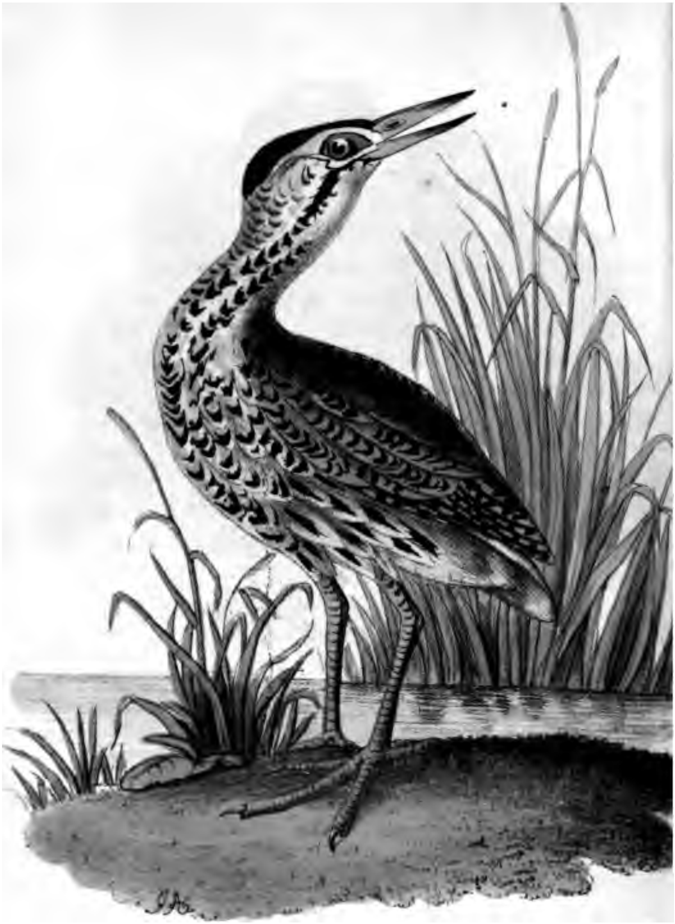
They assemble in flocks, and one of the party acts as a sentinel when the rest are feeding; and when it perceives the least danger, it utters a loud scream, like the sound of a trumpet, and instantly all are on the wing, and fill the air with their clamour. When at rest they stand on one leg, having the other drawn up to the body, and the head placed under the wing. When flying in bands they form an angle, like geese.

These beautiful birds were held in high estimation by the ancient Romans, who often used them in their grand sacrifices and sumptuous entertainments. Pliny, Martial, and other writers, celebrate the tongue as the most delicate of eatables.* The flesh of the appears of itself to be not very grateful to the pa but that of the young bird is considered a great cacy.

The movements of these birds at the periods of 1 migration are stated to be extremely amusing, an afford a splendid spectacle. Their fiery plumage, the regularity of their line of flight, with occasi halts, wheeling, circling, or spiral manœuvres ı they settle, give them the appearance of a flying aı Nor do their soldier-like movements and operat cease when they are upon the ground, for they m: and wheel in lines with the precision of a regimen review. Indeed, from their great and almost e powers on the wing and on foot, these birds are equ interesting in the air and on the earth.

---

* British Cyclopædia.

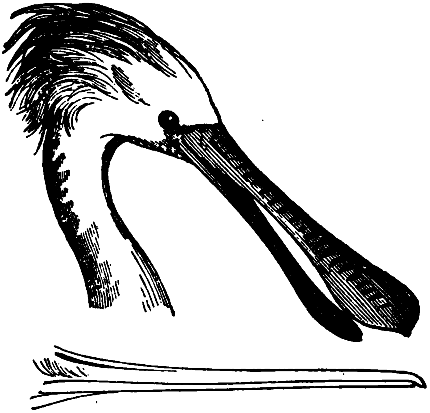


The Common Bittern

Herons, Cranes, Storks, etc.

We have now arrived at the most typical family of wading birds, *Ardeadæ*, and which contains the Herons, Cranes, Storks, etc. Many of the species are of a large size, and have long, compressed, conic, strong bills, ending in a sharp point; long legs and long toes, which latter are four in number, the hinder one being on a level with those in front; the claws are often large and crooked, and the middle are serrate on the inner margin. They have generally lean spare bodies, and emit rather a fetid smell. The food of the typical species consists of small fish, eels, reptiles, and other animal matters, which they search for in the shallow banks of rivers, lakes, and pools of water; others feed more upon vegetable matters, such as grain, seeds, etc., and have shorter and more appropriate bills for that kind of food.

In the genus *Platalea* (Spoonbills) we have another very extraordinary form of bill. It is straight, flattened both above and below, broad, flexible, and covered at its base with a membranous cere. Towards its extremity it expands into an oval disk of greater breadth than the remainder of the bill, and rounded at the point. The nostrils form two narrow oval fissures within the cere, at the base of the upper mandible, which is slightly grooved on either side by a longitudinal furrow, and terminates in a trifling hook. On the inside the mandibles are channelled, the margins of the channels being raised, and surmounted by a row of sharp projecting denticulations. With this organ the bird collects its food, which consists of the spawn and young of fishes and reptiles, by dabbling in the water and mud. It also feeds on water insects and their larvæ, as well as on the albuminous roots of some of the aquatic plants.

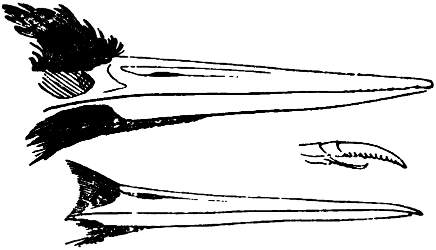


As is the case with many others of the long-necked birds which dabble, Spoonbills have a flexure of the windpipe, probably for holding a supply of air when the head is submerged, or for giving greater effect to the voice. The tongue is exceedingly short, triangular, and pointed; the throat capable of being distended to a pouch; the legs long, and covered with large reticulated scales; toes four in number, the three anterior united for a considerable distance by a web, which is continued in the shape of a fringe to their very extremities, and the posterior resting upon the ground for nearly its whole length.

Spoonbills live in societies, in wooded marshes, generally not far from the mouths of rivers, but are rarely seen on the sea-shore. They build in trees, in bushes, or amongst rushes, according to circumstances. They are pretty generally found in Europe, but are rare birds in Britain. Holland appears to be a principal place for their summer meetings. Mr. Bennett states that in winter they take up their quarters in various parts of Africa, extending southward even to the Cape of Good Hope. The flesh of the Spoonbill, when well fed and fat, is said nearly to resemble that of the goose in flavour. The entire plumage of the common White Spoonbill (*Platalea leucorodia*) is of a clear white, with the exception of a tawny yellowish spot on the breast of the adult, extending upwards on either side in the form of a narrow stripe, the two branches uniting on the back. The long narrow feathers which form a *crest* on the top of the head of mature males, fall gracefully backwards. A pale yellow tinge distinguishes the circumference of the eyes and the throat, and is again visible at the extremity of the bill, the remainder of which is of a dull black, with a bluish shade in the lateral grooves. The colour of the legs and feet is perfectly black; and the irides are of a bright orange-red.

By the genus *Cancroma*, or Boatbills, we are led to a group of birds which, for symmetry of form and the elegance of their motions and attitudes, are scarcely equalled in the whole class. We allude to the genus *Ardea*, comprising the Herons, Egrets, etc. The graceful curve of their slender neck, which is often adorned, as well as other parts of the body, with plumes of very delicate texture, their proportionably slender legs, together with their stately march and gentle manners, render them birds of considerable interest and attraction. They are very numerous in species; and they prey upon fish and reptiles, which they seize in shallow waters. The greater part of them watch for their prey from a fixed station, like the kingfisher and many of the fissirostral birds, and dart upon it with surprising swiftness, seizing it between the points of their long and sharp mandibles. They are birds of great powers of wing, flying sometimes very high and to a great distance; the neck being doubled, the head drawn in, and the long legs stretched out behind like a tail, and in all probability serving the same rudder-like office. They are pretty generally dispersed all over the world; one or other of their species being found in most countries. In all places they frequent the banks of ponds, lakes, and rivers, and some of them are occasionally met with on the shores of the sea. They do not rest for any length of time upon the ground, but prefer perching on the tops of trees, especially those whose branches spread laterally towards the top.

The bill of the Heron is peculiarly fitted for securing a firm hold of the slippery prey upon which it feeds. It is very strong, perfectly straight, compressed from the base; the margins serrated, or armed with sharp denticulations; the gonys strong and ascending. The bill of the Egrets is more slender, with the culmen inclining towards the tip, and bent downwards; the commissure slightly gaping towards the end. The tarsi of these birds are long and covered with large scales, and a great portion of the tibiæ naked. The nail of the middle toe is pectinated. The hind toe is of moderate length, and placed on the same level as the others; its claw is very long, arched, and pointed.



The purpose to which the denticulation on the claw of the middle toe is applied appears obvious when the nature of the prey is considered. Eels, frogs, fish, and such like slippery creatures, are the food of the Herons, and as the serratures of the mandibles are considered to be serviceable in retaining a firm hold of its prey when seized by the bill, so may the denticulation of the claw be applied in securing it, until it is deprived of life by a stroke of the bill.

We shall not find a more striking and beautiful instance of mechanical contrivance, and adaptation of form to peculiar habits, than we observe in this genus. Every part of the bird is fitted with the greatest exactness to the particular purpose for which it was created. The long slender legs and semi-palmated feet, with the hind toe extended backwards on a plane with those in front, enable it to wade in shallow water, where the food on which it is destined to subsist is to be found, and to preserve a firm and steady footing on muddy banks or in a running stream. The head, small and compact, tapers off to meet the bill, which is straight and strong, and terminates in a sharp point. A naked space intervenes between the base of the bill and the eyes, in order that no intervening obstacle may obstruct their sight; the neck, long and slender, and remarkable alike for the rapidity and grace of its flexures, which may probably be regulated in a certain degree by the sort of ruff of produced feathers that surround the lower part of the neck. To assist in steadying the rapid stroke of the bill when it is darted out upon the prey, the hinder portion of the head is often furnished with a beautiful flowing crest. As they are incapable of performing those rapid turns and evolutions in the air which the more powerful-winged rapacious birds do with facility, and as they are often on the wing, and take long journeys in their migrations, they are enabled to raise themselves to a very considerable height in the air, so as to be above almost every bird from which they need apprehend any danger. The Falcon, which was used in olden times to chase the Heron, is the only bird of prey which can rise to the full elevation of the Heron; but even from this enemy the bird escapes, by doubling the neck upon his shoulders, thereby altering the position of the axis of the body, and ascending above its antagonist. The flight of the Herons is by no means rapid in proportion to the magnitude of their wings, neither do they move these with so much velocity as many other birds. The body of the Heron is very light in proportion to the size of the wings, and it appears to swing between them, alternately rising and falling, as the points of the wings are raised or depressed. They are capable of protracted abstinence; but where there is plenty of food they are industrious and successful fishers. For hours they will stand in one spot immovable, as if inanimate, patiently watching for the chance appearance of prey. A distant observer might think them indolent and sluggish; but no sooner does a fish come in view, than every fibre seems buoyant with animation, and the victim is seized with electric celerity: the aim is rarely missed. Though most of them frequent obscure and lonely places, they have yet a good deal of social feeling about them. Those which, from the nature of their pastures, are forced to migrate, usually do so in large flocks; and in the breeding-grounds their nests, which are formed on the tops of trees, are generally crowded together, and closer even than those of rooks. The nests of the common species, *Ardea cinerea*, are broad and shallow, formed of sticks, and lined with soft vegetable matter, or with wool, if the birds can procure it. The eggs seldom exceed four in number, but they are sometimes as many as six. They are of a greenish-blue colour, and almost the size of ducks' eggs. The female sits closely during the incubation, and is fed by the male; and, after the young are hatched, both birds join in the labour of feeding them, which, from their veracity and vigorous digestion, is no easy task.

Herons are frequently inactive in the daytime, and indulge in repose; but seldom sleep during the night, at which time they generally feed, and are very clamorous and noisy. Their cry is shrill and piercing. They are remarkably shy and timid birds.

In days of old, when the Heron was a principal feature in the noble sport of hawking, and when the destruction of its eggs was visited with a penalty of twenty shillings, it seems to have held as high a place at the tables of the great as it did in the field. Thus at the "intronazation" of George Nevell, Archbishop of York, in the reign of Edward IV., we find in the bill of fare 400 heronshawes and 200 feasauntes, and it seems at one period to have been valued, as a dish, at the same price as the latter bird; for, from the prices in the Household-book of the fifth Earl of Northumberland, we find Herons marked at twelve pence, and pheasants at the same rate to a penny. At a marriage feast in Henry VIII.'s time, we find *Heronsewes* noted at the same price, and at another marriage feast, in the same year, two dozen *Heronsues* marked at twenty-four shillings. In the first of these records no mention is made of pheasants, but in the second they appear at that earlier time to have been rather more highly valued than Herons. And in the charges of Sir John Nevile of Chete (the knight in whose family the marriages above alluded to took place) at Lammas assizes, in the twentieth year of the reign of King Henry VIII., the pheasants appear to have cost somewhat more than the *Heronsews*, thirty of which are priced at thirty shillings, while twelve pheasants cost twenty shillings. The heron plume, made up of the fine large depending feathers, especially those above the wings, was highly valued.

In the present day the bird seems to have sunk into comparative insignificance. Mr. Selby, however, considers that the low estimation in which the flesh of the Heron is now held would seem to be in a great degree the effect of prejudice, or the fashion of taste, as, under proper treatment and good cookery, the Heron, when fat and in fine condition, is but little inferior to some of our wild fowl.

The elegant flowing plumes that decorate the White Heron, or Egret, have at times been much prized in various parts of Europe as ornaments for the head; they adorned the helmets of mailed warriors in the middle ages, and are still used for decorating the head-dresses of females, and the turbans of persons of rank in the East: the American Indians also employ them for the same purpose. The shafts of these feathers are long and tapering, and the webs consist of delicate filaments, very soft, and detached from each other. The tail is completely concealed by this graceful waving plumage. It is of a delicate yellowish tinge, all the rest of the plumage being of snowy whiteness. The bill of these birds is usually of a bright orange colour; that of the great White Heron (*Egretta Americana*) is about half a foot long, and black at the tip. The legs are black, long and strong; as are the toes, the middle and hind ones stretching nearly six inches from tip to tip; the middle claw is toothed on its inner edge, and the middle and exterior toes are united by membrane for about half an inch at the base.

We shall conclude our notice of this interesting family by an extract from Wilson's description of a nesting-place of the Great Herons (*Ardea herodias*). Many of their breeding-places, he says, occur in the Carolinas, chiefly in the vicinity of the sea. In the lower parts of New Jersey they have also their favourite places for building, and rearing their young. These are generally in gloomy solitudes of the tallest cedar swamps, where, if unmolested, they continue annually to breed for many years. These swamps are from half a mile to a mile in breadth, and sometimes five or six in length, and appear as if they occupied the former channel of some choked-up river, stream, lake, or arm of the sea. The appearance they present to a stranger is singular. A front of tall and perfectly straight trunks, rising to the height of fifty or sixty feet without a limb, and crowded in every direction; their tops so closely woven together as to shut out the day, spreading the gloom of a perpetual twilight below. On a nearer approach, they are found to rise out of the water, which, from the impregnation of the fallen leaves and roots of the cedars, is of the colour of brandy. Amidst this bottom of congregated springs, the ruins of the former forest lie piled in every state of confusion. The roots, prostrate logs, and, in many places, the water, are covered with green mantling moss, while an undergrowth of laurel, fifteen or twenty feet high, intersects every opening so completely as to render a passage through laborious and harassing beyond description; at every step, you either sink to the knees, clamber over fallen timber, squeeze yourself through between the stubborn laurels, or plunge to the middle in ponds made by the uprooting of large trees, which the green moss concealed from observation. In calm weather, the silence of death reigns in these dreary regions: a few interrupted rays of light shoot across the gloom; and unless for the occasional hollow screams of the Herons, and the melancholy chirping of one or two species of small birds, all is silence, solitude, and desolation. When a breeze rises, at first it sighs mournfully through the tops; but as the gale increases, the tall mast-like cedars wave like fishing-poles rubbing against each other, produce a variety of singular noises, that, with the help of a little imagination, resemble shrieks, groans, growling of bears, wolves, and such like comfortable music.

On the tops of the tallest of these cedars the Herons construct their nests, ten or fifteen pair sometimes occupying a particular part of the swamp. The nests are large, formed of sticks, and lined with smaller twigs; each occupies the top of a single tree. The eggs are generally four, of an oblong pointed form, larger than those of a hen, and of a light greenish-blue, without any spots. The young are produced about the middle of May, and remain on the trees until they are full as heavy as the old ones, being extremely fat before they are able to fly. They breed but once in the season. If disturbed in their breeding-place, the old birds fly occasionally over the spot, uttering at times a coarse hollow grunting noise like that of a hog, but much louder.

Audubon, in his graphic style, has described so admirably the motions of this bird, that in order to give some idea of them to the reader who may not have seen a Heron in its native haunts, we are induced to make an extract from his "Ornithological Biography." In my estimation, says that excellent delineator of the habits as well as the forms of birds, few of our waders are more interesting than the birds of this family. Their contours and movements are always graceful, if not elegant. Look on the one that stands near the margin of the pure stream; see his reflection dipping as it were into the smooth water, the bottom of which it might reach, had it not to contend with the numerous boughs of those magnificent trees. How calm, how silent, how grand is the scene! The tread of the tall bird himself no one hears, so carefully does he place his foot on the moist ground, cautiously suspending it for a while at each step of his progress. Now his golden eye glances over the surrounding objects, in surveying which he takes advantage of the full stretch of his graceful neck. Satisfied that no danger is near, he lays his head on his shoulders, allows the feathers of his breast to drop, and patiently awaits the approach of his finny prey. You might imagine what you see to be the statue of a bird, so motionless is it. But now, he moves; he has taken a silent step, and with great care he advances; slowly does he raise his head from his shoulders, and now, what a sudden start!—his formidable bill has transfixed a perch, which he beats to death upon the ground. See with what difficulty he gulps it down his capacious throat; and now his broad wings open, and away he slowly flies to another station, or perhaps to avoid his unwelcome observers.*

Were it not for the hollow booming sound heard at the spring of the year in those places which are suitable to the habits of the bird, the Bittern (genus

---

* American Ornithology.

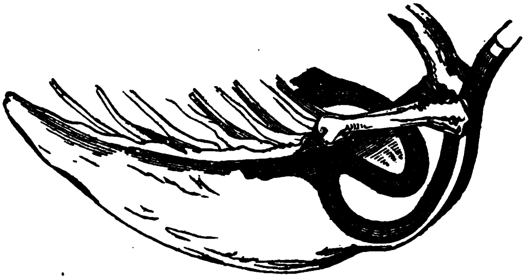
Butor) would never have attained the notoriety it enjoys, being very solitary and retiring in its nature, and but rarely seen. It is a bird that haunts the wooded swamps of reedy marshes, where it generally lies hid all day, and comes forth to feed at night. It flies from the resorts of man, and the progress of cultivation drives it from its favourite haunts. It has ever been considered as the bird of desolation. In the terrible curse which the prophet denounces in the name of God against Babylon, it is made use of as an emblematical symbol of the total destruction which came upon that famous city, "I will make it a possession for the Bittern, and pools of water; and I will sweep it with the broom of destruction, saith the LORD of Hosts." Inhabiting a different locality to that in which Herons are generally to be found, we accordingly find a change in the form and character of its feet, and in the colour of its plumage, in accordance with the difference of its pasture. Its plumage has more resemblance to that of the snipes in its colours, as well as of the rails, than to the Herons. The toes are long, the hinder toe much lengthened; the inner toe considerably longer than the outer; the claws are all long and slender, and very slightly curved, that on the middle toe being finely serrated; and altogether the foot indicates a walker upon herbage which is elastic, rather than upon an even surface. The bill is very similar to that organ in Herons, being rather long, compressed, sharp pointed, and finely serrated on the margins of both mandibles towards the point. There is a considerable difference between the bearing and action of the neck of the Bittern and of the Heron. The neck of the Bittern, measured from its first articulation, is nearly as long in proportion as that of the Heron, that is, about as long as the body. But when the Bittern flies, the neck is stretched out; when it walks, it is borne upright, with the line of the forehead and bill horizontal; and when the bird reposes, which is always among tall herbage on the ground, and never upon trees, the position of rest is with the neck erected, and the bill in the same line with it, or with the tip pointing to the zenith. While the bill of the Heron is held in readiness to act *below* the plane of the body, that of the Bittern is held ready to act in the same plane, or above it; for when it is at rest, the neck is so far bent that the bird can strike upward with the bill.

The Common Bittern (*Butor stellaris*) was once more frequently found in England than it is at present. In many parts of England the cry of the Bittern is now seldom or never heard, and though it may be found occasionally in some of the more extended and lonely marshes, it is a rare bird. Those, says Goldsmith, who have walked in an evening by the sedgy sides of unfrequented rivers must remember a variety of notes from different water fowl—the wild scream of the wild goose, the croaking of the mallard, the whirring of the lapwing, and the tremulous neighing of the jack-snipe; but of all those sounds there is none so dismally hollow as the booming of the Bittern. It is impossible for words to give those who have never heard this evening call an adequate idea of its solemnity. It is like the interrupted bellowing of a bull, but hollower and louder, and is audible at a mile's distance, as if issuing from some formidable being that resided at the bottom of the waters.

In size the common Bittern is less than the common Heron, being about two feet and a half in length. The bill is about four inches long, brown above, yellowish below; irides yellow; feathers on the crown black, spotted with green; those of the hinder part of the head, neck, and breast long and loose; general colour of plumage dull pale yellow, variegated with spots and bars of black; tail short; legs moderate, pale green.

With the graceful motions and majestic gait of many of the Cranes (genus *Grus*) most persons are acquainted. There are few species which exhibit more elegance and symmetry of form, as well as graceful deportment, than the Numidian Crane (*Anthropoïdes virgo*), to which the French Academicians have given the name *Demoiselle*. The colours of its plumage are sober, and beautifully blended and contrasted with each other. These birds are so mild and gentle in all their movements, and in captivity are so good tempered and lively withal, that they seldom fail to be objects of peculiar attraction. In an upright position the Demoiselle measures about three feet six inches to the top of the head, and its length from the point of the bill to the tip of the tail is about three feet. A patch of light grey occupies the whole of the upper surface of the head, the sides of which, together with the neck, including the long and slender pointed feathers which depend from its lower part over the breast, are of a uniform but not intense shade of black. Every part of the head and neck is fully plumed. Behind each eye there passes off in a backward direction a tuft of pure white feathers, three or four inches in length. These ear lappets, or crests as they are improperly termed, are extremely light and flexible, and have their barbs so loose as to float in graceful undulations on the slightest motion of the bird. The rest of the plumage, with the exception of the outer halves of the quill-feathers of the wings and tail, is of a uniform slaty grey.

The voice of the Crane is peculiarly loud and sonorous, more particularly when on their migratory flights, which often take place at night. The convolution of the lengthened trachea within the keel of the breast-bone has probably some effect in producing this loudness of voice. The trachea and breast-bone of the Demoiselle Crane is figured in the cut.



Of the genus *Ciconia*, comprising the Storks, we shall give a short notice of the Common or White Stork (*Ciconia alba*), which was at one time frequently seen in this country, but is now only exhibited in menageries. It is common in Holland, and is a visitor to the continent of Europe, from the north of Spain to Prussia, generally passing its winters in the north of Africa, and more particularly in Egypt.

Among the ancient Egyptians the Stork was regarded with a reverence inferior only to that which, from similar causes, was paid to the Sacred Ibis, considered, and with some show of reason, as one of the tutelary divinities of the land. The same feeling is still prevalent in many parts of Africa and the East; and even in Switzerland and in Holland something like superstition seems to mingle, in the minds of the common people, with the hospitable kindness which a strong conviction of its utility disposes them to evince towards this favourite bird.

On the other hand, the White Stork appears to be influenced by the same friendly feelings towards man. Undismayed by his presence, it builds its nest upon the house-top, or on the summits of the loftiest trees in the immediate neighbourhood of the most frequented places. It stalks perfectly at its ease along the busy streets of the most crowded town, and seeks its food on the banks of rivers or in fens in close vicinity to his abode.

It is so docile and gentle in its disposition that it has been known to associate with children when at their games, and to partake of their amusements. Gratitude, conjugal fidelity, and filial and paternal affection have been reckoned among the engaging attributes of these birds. In many parts of Holland the nest remains on the chimney-top undisturbed for years, and with wonderful constancy the same pair return to the same haunts, and join in mutual and fond caresses after their long voyage. The tender affection which the Stork manifests for her young has been proverbial even from remote antiquity. The often repeated history of the female which at the conflagration of Delft, after repeated and unsuccessful attempts to carry off her young ones, chose rather to perish with them in the general ruin than to leave them to their fate, should never be omitted in any history of these birds. The eggs are generally from two to four in number, of a dingy yellowish-white, rather longer than those of a goose, but not so broad.

In some places Storks nestle very closely together, but they always live in the greatest harmony. At Bagdad there are hundreds of nests on the houses, the walls, and the trees; which sometimes present a very remarkable appearance. The *minars* or towers of the mosques at Constantinople, and most other parts of Turkey, are tall round pillars surmounted by a very pointed cone; but at Bagdad the absence of this cone enables these birds to build their nests upon the summit, and as the diameter of the nest generally corresponds with that of the minar, it appears as a part of it, and a regular termination to it. The curious effect is not a little increased by the appearance of the bird itself on the nest, which thus, as a part of its body and long neck are seen above the edge, appears the crowning object of the pillar.

The food of these birds consists of various kinds of garbage, of worms and insects, fishes and reptiles, and among the latter, more particularly of frogs. The bill, which is without marginal serratures and is usually of an orange-red, measures from seven to eight inches in length; the naked and wrinkled skin surrounding the eyes is nearly of the same colour, but generally of a duskier hue; its legs are also red. The greater part of the plumage is of a clear white, which is, however, relieved by the striking contrast of the feathers covering the lower part of the shoulders, the larger wing-coverts and the quill-feathers, thirty in number, all of which are of a glossy black, with a slight metallic reflection. When fully expanded, the extent of the wings exceeds six feet, and in this state the eight or nine primary quill-feathers offer a very singular and indeed unique disposition, being separated from each other so as to leave a vacant space between. The feathers of the lower part of the neck are long, pendulous, and pointed; the males and females do not differ in appearance. They measure rather more than three feet from the tip of the bill to the extremity of the tail, and the top of the head is about the same height from the ground.

The Marabou (*Mycteria Marabou*) is one of three gigantic species of Stork, natives of Africa and Eastern Asia, which are distinguished by the peculiarity of their head and neck being destitute of plumage, the latter having a fleshy enlargement at its lower extremity, which often becomes deeply pendulous, and the much greater proportional enlargement of the bill. The Marabou is a native of Africa, and is a smaller bird than the Indian species, which is known by the name of Adjutant, or Argala of the natives. There is also an American species, which is much smaller than either of the others.

The important office which Storks perform in tropical countries in the removal of carrion, offal, and other nuisances which are often collected in the villages and towns, and which they devour without scruple and in immense quantities, has obtained for them a universal privilege of freedom from annoyance. They are peaceable in their manners, and never attack or kill any but the very smallest of warm-blooded animals. They feed likewise upon reptiles, fishes, and occasionally birds. The bones and indigestible parts of the food that they swallow are returned by the gape after all the digestible part has been removed by the action of the gastric juice. In flying they do not extend the neck, but fold it back on the shoulders, though they project the feet behind.

They all furnish, in more or less perfection, the beautiful plumes, superior in estimation even to those of the ostrich, known by the name of Marabous, from their appellation in Senegal. These desired plumes form the under tail-coverts of the birds.

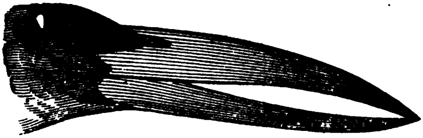
The Adjutant, or Indian species, is ash coloured, except the belly and part of the scapulars and wing-coverts, which are white. The gullet is capable of vast extension, so that the bird could easily swallow an animal as large as a common wild rabbit. The craw is also very extensile, and hangs like a pouch in front of the breast. The height of this species in an erect posture is six feet, or even more than that; and the wings from tip to tip measure little less than fifteen feet.

They are uncouth and we might almost say ugly birds. Their colour is dingy, and their bare head and neck, with the ruff of produced feathers, make them look ragged, as if the plumage of those parts had been torn off. The noise which they make is hoarse *and grating*, and resembles the roaring of a beast of prey. The length and strength of their legs, however, enable them to march with long strides, and in stately manner, and when on the wing they appear very large, though they have the swinging flight which is characteristic of all the tribe of Herons, Cranes, and Storks.

In India they haunt the jungles of the Lower Ganges in the dry season; and as the rains set in they migrate up the valley of the river, being almost as common in Calcutta and the other towns as sparrows are in any part of England. They stand upon the tops of the buildings, walk the streets, and are especially abundant in those parts of the towns which are inhabited by Hindoos, who pay little attention to cleanliness.*

Though so gigantic in size they appear to have little or no courage; they will not attack even a small animal, but if it shows an inclination to fight, the giant birds will scream, or rather roar, elevate their wings, and open their great bill, as if they would swallow all before them, but they strike not, and a child may drive them off with a switch.

The Umber genus, *Scopus*, and the Open-beak, *Anastomus*, may likewise be included in this family. Of the former there is only one species known, the Tufted Umber, a native of Africa. It is obviously



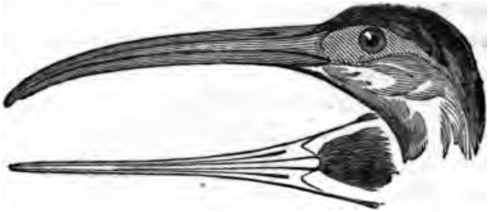
---

* British Cyclopædia.

allied, Mr. Swainson observes, to the Open-bills; a singular form, remarkable for a thick and very powerful bill, gaping in the middle. It is impossible to divine what purpose this structure, altogether unique among birds, is intended to serve, since their economy has never been explained.

Our next family, *Tantalidæ*, comprising the genera *Tantalus* and *Ibis*, and, according to Mr. Swainson, *Aramus* also, includes birds well known for many curious particulars connected with the history and superstitions of the inhabitants of ancient Egypt, for the pureness and decided contrast, as well as the dazzling richness, of the plumage of some other species. The *Tantalidæ*, or Ibises, says Mr. Swainson, are large and singular birds, living almost entirely on the swampy banks of rivers and fresh waters, and rarely, if ever, frequenting open shores, like the more typical waders. Their habits and structure seem compounded of those belonging to the Herons on one side, and to the Rails on the other; their flight and size remind us of the former, while their long toes and insectivorous nature are more in unison with the latter.*

The general character of the group may be



described as follows: bill long, cylindrical, arched, enlarged at the base and depressed at the tip, which is rounded and obtuse; the upper mandible furrowed with deep nasal grooves for its whole length; nostrils at the base of the upper mandible partly covered by membrane. Face or head more or less naked. Legs long and slender; hinder toe on the same plane as the others; middle and outer toe united by membrane; a shorter membrane connects the middle with the inner toe. Some species have the tarsi covered with articulated scales, other have them shielded with plates.

---

* Classification of Birds.

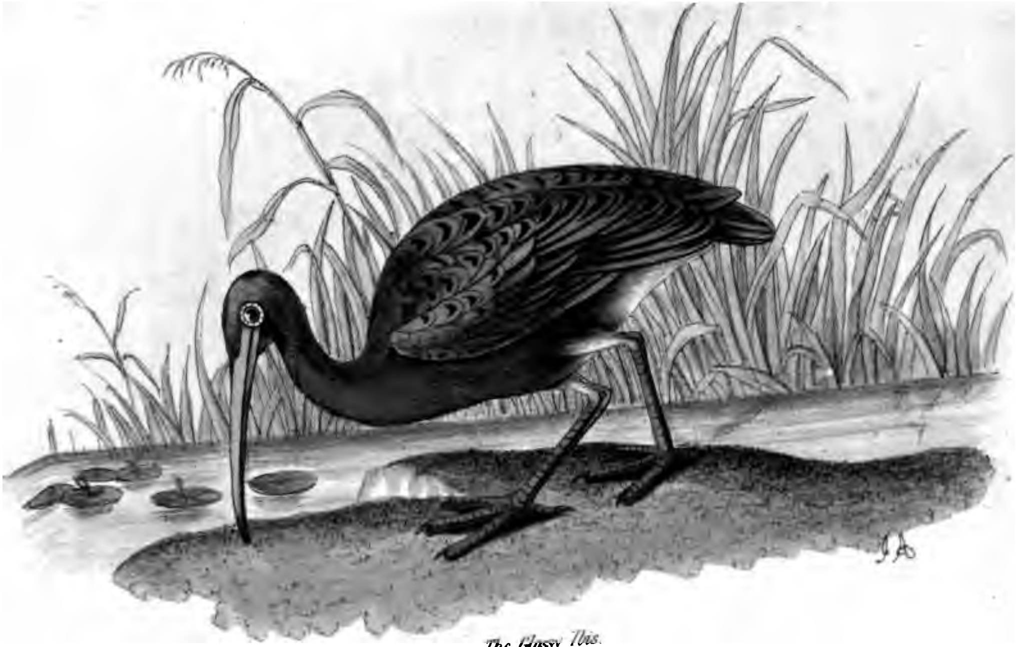
The Abou-Hannès (Father John, of Bruce), *Ibis religiosa*, or Sacred Ibis, is the most known, although till very lately naturalists were ignorant of the particular species which was so highly celebrated in the mythological history of ancient Egypt. It is about the size of a common fowl, with the plumage entirely white, except the quill-feathers, the points of which are black. The barbs of the last coverts of the wings are long and slender, and fall over the extremities of the closed wings and tail; these are also black, with violet reflections. The bill and feet, as well as the naked part of the head and neck, are black.

These birds are very common in the central parts of Africa, and also in that part of the valley of the Nile which is occasionally flooded. Sometimes they are found solitary, and at other times they are found in groups of about ten or twelve. They diligently search the soft mud for food, walking with a stately measured step.

The Ibis was reared in the temples of ancient Egypt, with a degree of respect bordering on adoration, and when dead it was embalmed. The cause of the peculiar veneration in which this bird was held has not been satisfactorily determined by our learned antiquaries.

One of the most splendid of the feathered race, when in its adult plumage, is the Scarlet Ibis (*Ibis ruber*). When fully grown it measures from twenty to twenty-five inches in height. The colour of its plumage is, as its name imports, entirely scarlet, with the exception of the tips of the quill-feathers of its wings, which are black. The naked part of its cheeks, its bill, legs, and feet are of a pale reddish-brown. Its legs are covered with large scales. When first hatched, the young are covered with a blackish down, which soon changes to an ash colour, and at length becomes nearly white. This change occurs about the period at which they begin to fly; after the second moulting they assume a tinge of red, which gradually becomes deeper and more distinct, appearing first on the back, and then spreading over the sides and under parts of the body. Its brilliancy increases as the bird advances in age. This beautiful species is a native of the tropical regions of America, and frequents the sea-shores and mouths of the larger rivers in large bands, feeding upon insects, shell-fish, and the smaller fish. It generally lies concealed during the heat of the day and in the night, and seeks its food only in the morning and evening. Its nest is built among the thickets, and is of the most singular construction.

There can be little doubt that the grallatorial birds are united to those of the natatorial order by the family which forms the second aberrant group in our

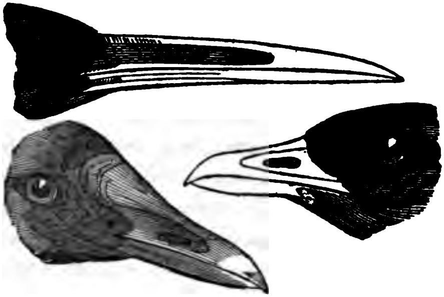


The Glossy Ibis.

arrangement of the Grallatores. The semi-aquatic habits of many of the genera which compose the family *Rallidæ* appear to point out immediately their position in the system. Many of these are capable of swimming with facility, and we appear to be led by a gradual development of this power to the very verge of the order which contains the true swimming birds. We have observed a near approach to the palmated foot of the water birds in some of the waders, in the Flamingo, for example, and some others; but this formation was apparently only intended to facilitate the progress of the bird upon the soft oozy surfaces upon which its food was to be found, and not as a means of propelling it along the surface of the water; and although the foot of the Flamingo has greater resemblance to that of the water bird than the foot of any species of Rail, yet some of the latter birds are much more in the habit of swimming than the Flamingo is, and, moreover, can dive as well as swim with facility.

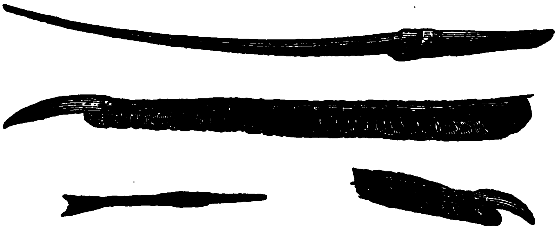
This family contains the Rails, Water-hens, Coots, etc., constituting a very natural and well-marked family in the order of Waders. The most prominent differences in their structure, when compared with the foregoing families, are the great size of the legs, the length of the toes, particularly the hinder one, the front toes being free and unconnected by membrane, the backward position of the legs and the shortness of the wings and tail. Resorting to the thickest shelter of reeds and aquatic vegetables which clothe the sides of rivers and morasses, their bodies are generally thin and compressed, to enable them to thread their way through them with great facility. Some of the species, however, do not frequent the margin of the waters, but resort to the tall herbage of moist corn-fields and meadows, where their peculiar call is more often heard than a sight of the bird is obtained. The food of the Rails, it is generally believed, consists of soft animal substances, such as worms, mollusca, insects, etc.; aquatic seeds and other vegetable aliment are also said to form a portion of their diet.

In the present family the bill displays considerable modification of structure; and the whole family may be divided into three genera, according to the peculiar character of the bill observed in each, viz., Water Rails, under the generic title *Rallus*, in which the bill is as long or longer than the head, and comparatively slender; Land Rails, or Crakes, forming the genus *Crex*, and which have the bill shorter than the head, strong at the base, and tapering to the



point; and Gallinules, or the genus *Gallinula*, these being distinguished by the extension of the upper mandible over the front or forehead, so as to form a kind of flat cartilaginous shield on that part.

A still greater modification of form is observed in the feet of these birds. In all the species they are stout, with the toes very much lengthened, and free or divided to their bases; but the birds in which this elongation of the toes is carried to the greatest extent are the Jacanas, natives of the marshy parts of most tropical countries. The African Jacana whose body is about the size of our green Woodpecker, has yet such an enormous foot that the front toes measure no less than three inches and a quarter, and the hind toe two inches and a half.* The claws are perfectly straight and sharp pointed, and of such uncommon length, that the hinder one measures at least two inches. By means of this structure of foot and the great elasticity of the toes these birds are enabled to run lightly upon aquatic plants, and the half-floating herbage which covers the surface of stagnant waters in their native climes, clearing them of insects and other small animals which are not available either to flying or swimming birds. The tarsi of these birds



---

* The lower figure in the engraving represents the middle toe of the common Water-hen.

are also very long and strong, as well as the tibiæ, which are naked of feathers for the greater part of their length. The bill is of moderate length, not exceeding that of the head. It is straight, slender, slightly compressed, rather enlarged at the point, flattened at the base, where it extends to a sort of plate on the forehead. The wings are of mean length, or rather long for the size of the bird. On the bend of each wing is a large horny spur, slightly curved and very sharp-pointed; the use of this appendage to the wing has not been ascertained.

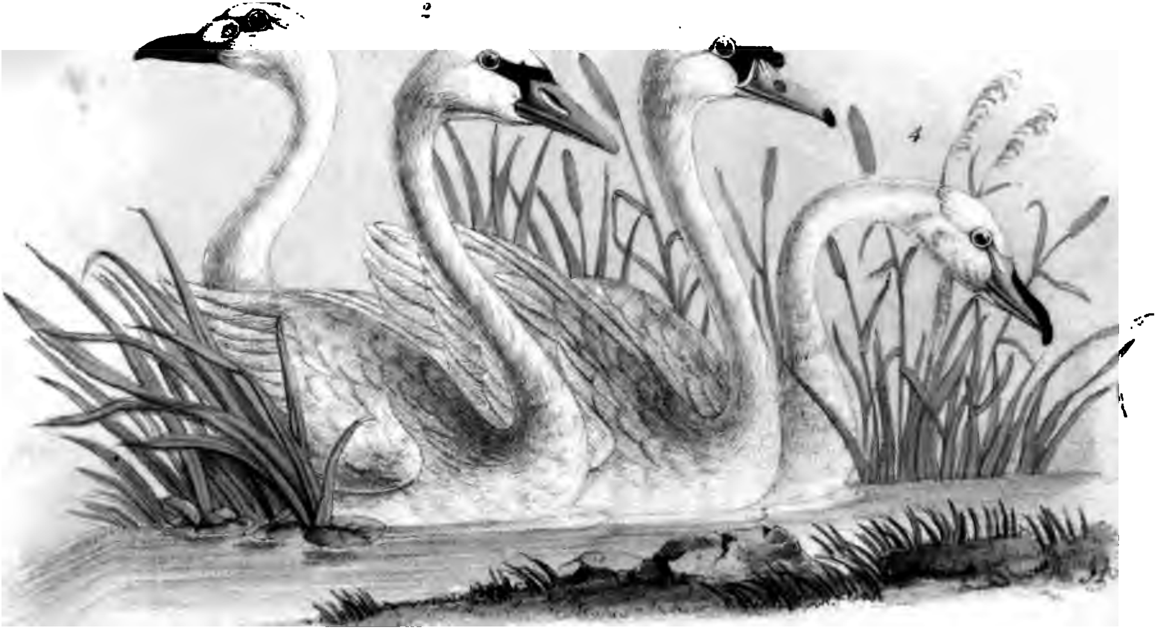
Along the banks of running streams and water-courses thickly clothed with sedge, rushes, and reeds, and flowing through low and marshy districts, the Water Rail (*Rallus aquaticus*) may occasionally be found. It breeds in this country, remaining nearly stationary all the year round in some places, but it migrates entirely from others during the severe weather of winter. It is about twelve inches in length; the bill measuring an inch and three quarters; its colour dusky; but reddish at the base of the upper and greater part of the lower mandible; iris red.

The whole upper part of the plumage is of an olive-brown, the middle of each feather being black beneath; from the chin to the vent deep ash colour, mixed with brown on the lower belly and vent; on the sides about the thigh there are several transverse bars of black and white, slightly tinged with orange; quill-feathers dusky; tail short, dusky, with olive margins to the feathers, which are twelve in number, and covered by the feathers above; under tail-coverts white. Legs reddish-brown; toes long and slender, divided to their origin.

The nest is placed in close concealment amongst the thickest aquatic plants, and frequently in willow beds. The eggs are nearly or altogether white; they are rather numerous, but the number varies considerably.

The Gallinules, Sultanas, and Coots follow in succession. As an example of the general form we refer to the common Water-hen (*Gallinula chloropus*), Moor-hen, or Marsh-hen, a bird which is pretty generally distributed both in the southern and northern parts of this island; but we need not enter into any minute description of the characters or colours of this species, as it is generally known.

As we approach the confines of the natatorial order, we observe a greater tendency in the birds which form the exterior groups of the present family to aquatic habits. In tracing the succession of families of which the grallatorial order is composed, we have observed the forms best adapted to the firm surface of the sandy shore, or to inland districts away from the water; to the watery marshes of low lands, and the soft mud of estuaries and flooded grounds. We have examined the structure of the foot, and the general form of those birds that seek their food by wading into the water of reedy pools, or more open and shallow shores of rivers and of lakes. We have observed that some of the species are possessed of the power of swimming when forced to take the water; and we have now arrived at that species or genus of grallatorial birds which habitually frequents the water, and walks with difficulty upon land. The Coots (*Fulica*) are the most aquatic group of this family; they are rarely seen on land, living and travelling in the liquid element, and swimming and diving with equal facility. But they inhabit fresh waters, gulfs, and bays, and venture not into the deep and open seas. Their food is principally aquatic vegetables and insects. Next to the Jacanas these birds have the largest claws among the Rail family; the middle toe often measuring four inches, while the size and strength of the whole foot is unexampled in the grallatorial order. The foot of the Coot has the oblique motion of a swimming bird, and is articulated far backward; the tarsus is flattened laterally, so that it may be brought forward with less resistance from the water. The hind toe is more like that of a duck than of a grallatorial bird, and hence we find that although the Coot dives and swims admirably, it walks with difficulty and unsteadiness. The external toe has two and the middle three lobes on each side, each pair distinctly divided; these correspond with the number of joints; the lobes on the inner toe are all united, and the number of four can only be traced by the articulations, and by the margin of the membrane being very slightly scalloped, adjoining thereto: the claws are moderately long, strong, very acute, and nearly straight. The foot of the Coot is thus adapted for swimming, or to any form of surface upon which the bird may have occasion to walk in the immediate vicinity of its accustomed water haunts. Even the produced hind toe has its uses in throwing the foot upwards, and also in walking upon grassy and other elastic surfaces. Although the Coot's foot may to the sight appear clumsy and cumbersome to the bird, yet, when all its applications are investigated and understood, it is found to be an instrument of beautiful contrivance to enable the bird to perform its functions with the greatest facility and ease to itself.



British Swans

[illegible]

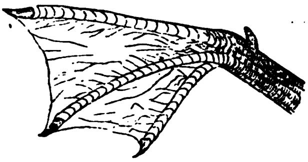
Geese, Swans, and Ducks.

NATATORES.

The birds which now come under our notice form the last great division of the ornithological circle. They are distinct from all others of the class, as well by the difference of their form and plumage, as by the peculiar formation of their feet; the toes being invariably connected for their whole length by an expansive membrane, which, in some species, even connects the hinder toe with those in front. They are the "water birds," or those which habitually swim and seek their food in or upon that element, and are as beautifully formed and fitted for such a purpose as the "land birds" are for maintaining their existence upon or over the land. As the latter feed principally upon those substances, either animal or vegetable, which are only produced or found upon the land, so the former generally subsist upon marine or aquatic productions. The ocean is their element, and its waters supply them with food. They skim the rolling flood; they dive beneath the surface or repose upon the wave, heedless alike of wind or storm. They are pre-eminently the birds of the waters; their forms, observes Mr. Mudie, are those of ships; their plumage is proof against humidity and cold, no rain mats, and no wind ruffles it; their feet are paddles, or oars their whole air is marine, and their very voices are tuned, if tuned it can be called, to the wailing wind, the thundering surge, or the hissing foam.

They are all able to swim, and with some swimming is the principal motion; yet there are many of them that fly more than they swim, and some of them walk with freedom, and even grace. Others, again, neither fly nor walk, but are enabled to make their way beneath the surface of the water, and at a considerable depth, where they find a plentiful banquet provided for them, and a safe retreat against the attacks of any aerial enemy that may pursue them.

Although it is necessary that, as swimming birds, the form of their bodies must be in a certain degree similar, yet they are fashioned to the kind of motion to be performed, either on, under, or above the water. The bird that remains in a measure stationary, floating and dabbling about on the surface, has the body flat and square, like a punt; those requiring rapid motion through the air, have it narrowed backward; and to shoot along wholly immersed in water, the fore part is pointed. The necks of swimming birds are generally longer than their legs. Their wings vary in length and structure; some are long and powerful, others merely rudimental. Their bills vary as much in structure: some are long and spear-like; some toothed for holding prey securely; others suited to cut and tear carcases at times found floating or cast on shore; while others are fitted for dabbling in mud and shallows. Their feet, almost always short relatively to the body, are generally placed far behind the *point of* equilibrium, and are thus adapted for pro-



pelling the body when floating; and this propulsion is assisted by the lengthy toes united by a thin, firm, and expansive web. The feet then act as broad paddles, but collapsing when the leg is brought forward to make another stroke.

The structure of the plumage, says Swainson, is particularly adapted to resist wet; its outer surface is close, compact, smooth, and somewhat oily; beneath this there is a second series of feathers of a soft and downy texture, which is not only impenetrable to water, but calculated at the same time to keep the body in a constant and equal state of warmth, and thus to guard the bird from those injurious effects resulting from sudden transitions of cold and heat.*

In form, the body of the swimming bird is broad and flat beneath, to give the bird stability in its liquid element, and it is covered with a coating of thick down and closely set feathers, which resist water, and add greatly to its buoyancy; the tail is short, and in some species elevated considerably above the surface of the water. The breast-bone is flattened, and extends with the ribs along the whole of that part which is in the water. The keel is shallow, being generally lower than half the width of the sternum, and thus a large base is presented to the water in proportion to the weight of the birds, enabling them to swim more lightly.

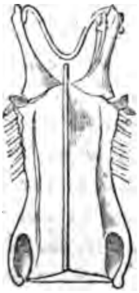
---

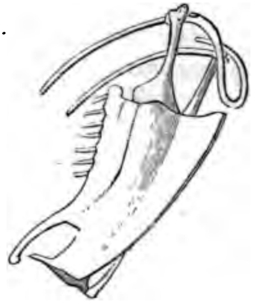
* Classification of Birds.

The habit of floating along the water is, however, in the different genera and species of these birds, says Mr. Mudie, combined with so many modifications of other habits, that it is subject to numerous though slight variations. These habits are greater or less degrees of flying, walking, and diving, and the swimming or floating character, which is the principal one of this order, is modified in accordance with these habits.

They have the sternum elongated, varying in breadth, narrower in the middle than at the extremities. The lower edge of the keel is sometimes curved, sometimes straight, and the anterior one generally concave; and in some of the species there is a cavity at the base of the crest, in which a duplicature of the trachea is lodged. The coracoids are never very long; they are large at their bases, and rather firmly attached to the sternum.

There are seven or eight ribs (in some cases nine) on each side of the sternum, and the posterior part of that bone is generally divided by notches, though the





heads of the processes are so much produced as nearly to meet each other. The clavicle is of moderate length and well arched, and the shoulder-bones rather slender, and arched through the whole extent. The general character is that of having the bones of the shoulder much more exclusively supported from the sternum than is the case in the wading birds. The accompanying figures of the sternal apparatus of the Nyzoca Pochard, or White-eyed Duck, may be taken as a specimen.*

The legs are articulated about the centre of gravity, so that the axis of the body is nearly horizontal, or in the rear of it; the latter position indicates a more aquatic character, since it greatly facilitates progression through water, though less adapted for progression on land. They are wide apart, so that the bird may the better work them in water, and throw them out clear of the body; in species whose chief motion is swimming, the legs are thrown outwards in rather an oblique direction. The foot has four toes; the outer one longer than the inner, and all the front toes are united by membrane to the nails. In swimming, the legs are used alternately, as in walking; the divers, however, strike with both feet at once, when making way beneath the surface, as frogs do. The hind toe of diving ducks is broad, and has a membranous lobe, acting probably as a rudder to those in front. There is also a rolling and twisting motion of the feet and legs of these birds peculiar to them, which no doubt facilitates their diving. The lobe in the hind toe is the only characteristic distinction between oceanic and river ducks. In some species of swimming birds the tibiæ are partially bare, but generally clothed with feathers.

---

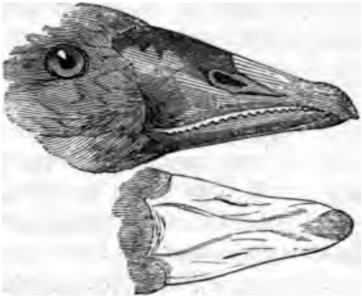
* Natural History of Birds.

This division of the feathered race is composed of the following families, viz., *Anatidæ*, or Ducks, including Swans and Geese; *Colymbidæ*, or Divers; *Alcadæ*, Auks and Penguins; *Pelicanidæ*, Pelicans; and *Laridæ*, Gulls. The Geese, Swans, and Ducks, from being less aquatic, generally speaking, than any other family of this order, and feeding more upon vegetable substances, are placed as the first aberrant family. The succeeding family exhibits a more decidedly aquatic character, but the birds are capable of flying; which power is denied to those forming our typical group in the family *Alcadæ*. Their form is specially adapted for oceanic life, for diving and rapid swimming. Next in succession are the *Pelicanidæ*, which have in general considerable wing-power, and pursue their prey above the water, instead of beneath the surface; and the *Laridæ*, or Gulls, form the concluding group of natatorial birds. These are indiscriminate feeders upon garbage and marine animal substances, either living or dead; some of the species display a raptorial propensity, and others approach the habits and character of the *Vulturidæ*.

The general characters of the *Anatidæ* may be thus described:—Bill very broad, of moderate length, more or less flattened or expanded towards the tip, which has a nail at the point of the upper mandible; raised at the base; clothed with a continuation of the common epidermis, instead of the usual horny covering; the margins of both mandibles furnished with *flexible,* transverse, lamellar plates, or ridges; tongue hard and fleshy. Legs stout, wide apart, with the front toes united by membrane as far as the nails; the hind toe short, and placed rather high up on the tarsus.

We proceed to consider this very numerous family as divided into the following sub-families, viz., *Cereopsinæ; Anserinæ*, comprising Geese and Swans; *Anatinæ*, River Ducks; *Fuligulinæ*, Sea Ducks; and *Mergansinæ*, Merganses.

Of all the genera which comprise the family *Anatidæ*, Geese (genus *Anser*) are the most terrestrial in their habits; they are less upon the water, and feed more upon vegetable substances than any of the others; and although completely web-footed, and can all swim, swimming is not their chief motion; they walk well, that is, for a swimming bird, and have considerable power in their wings. Their generic characters are—the bill shorter than the head, higher than wide at the base, diminishing toward the tip, and thus having a slightly conical form; the teeth in the margins and toward the tip of the bill are conical, and the point of the upper mandible is generally furnished with a nail of harder consistence than the rest, and sometimes differently coloured. The body of the Goose is thick and heavy; the legs are strong, and



articulated near the centre of gravity; wings moderate.

Geese are generally polygamous, and breed in great numbers in barren grounds and marshes. Their utility to man, independent of their value as food, is well known. They are most abundant in polar countries, and in those of the northern rather than the southern hemisphere. They are migratory, being driven southwards when their pastures are frozen up or covered with snow, and returning to their native regions when a milder temperature prevails. Their flight is high, and its mode peculiar. They journey in flocks of about fifty or a hundred individuals, generally extended in a line abreast, or in two lines forming an acute angle, the bird at the angle taking the lead; when wearied by thus breasting the air, it falls back into the rear, and the next in order occupies its place.

In the partial nakedness of the leg above the tarsal joint, and some of its habits, the genus *Cereopsis* appears to approximate nearer to the wading birds than any other species of this family. It forms the subfamily *Cereopsinæ* in our system, in accordance with Mr. Vigors's arrangement. It is a native of New Holland, and was for some time classed in the wading order. M. Temminck, however, in 1824 only, placed it at the head of the swimming birds, with which its external form appeared to associate it. There can be no doubt, says Mr. Bennett, from observations of the living birds, that this is its proper place in nature, yet it has a great affinity to the wading birds, which is shown by the nakedness of the legs above the joint, and by the incomplete palmation of the feet, as well as by some particulars of its anatomy.

The peculiarities of structure which distinguish this bird from other Geese are not very important, but well marked. The base of the bill is covered by a broad cere or naked skin, which leaves but a small portion of the bill uncovered, and which is terminated by a broad truncated hook; the nostrils are placed near the middle of the cere. Legs rather long; tarsi covered with hexagonal scales; tibiæ bare of feathers for some distance above the joint. Toes semi-palmated; hinder toe not touching the ground. The number of feathers in the tail of the *Cereopsis* sixteen, while they are only twelve in the Goose.

Another species of the same group of long-legged Geese is the Spur-winged, or Gambo Goose (*Anser Gambensis*, or *Plectopterus Gambensis* of modern authors), a native of northern and more particularly of western Africa. Its size and proportions are nearly those of a common Goose; its legs long, and placed beneath the middle of the body; neck of moderate length, and proportionate thickness. At the base of the bill, which is broad and flat, it has a tubercle like that of a Tame Swan, increasing in size with the age of the individual; and the bend of its wings is furnished with a large blunt spur, which appears to be occasionally doubled. The bill and tubercle at its base are of a dull red; the sides of the head white; the upper part of the body black, with a metallic brilliancy; a patch of white, mottled with black spots, occupies the base of each of the wings; and the under parts are white, sometimes marked with indistinct zigzag lines of grey. The legs have an obscure tinge of red, and the spurs of the wings are horn coloured.

There is a species inhabiting Guinea, *Anser cygnoides*, whose characters are so intermediate between the Geese and the Swans, that it has been called the Swan-Goose. It is arranged by Cuvier with the Swans. It domesticates and even breeds with common geese in farm-yards, and it has their habits, though the bill resembles that of the Swan. It is distinguished from others of the Goose tribe by its majestic walk and long neck; by a large knob on the base of the upper mandible, and a skin (almost bare of feathers) hanging down like a pouch or wattle under the throat. The back and upper parts are of a brownish-grey edged with a lighter colour; the sides and the feathers which cover the thighs are clouded with nearly the same colours as the back, and edged with white; the belly white; the fore part of the neck and breast yellowish-brown; legs orange.

Of all water birds, the Swans, particularly the Tame Swan (*Cygnus Olor*), have the most majestic appearance upon water. They are the most elegant birds of the whole tribe. More aquatic in their habits than the generality of geese, they are enabled, by the graceful elongation of their necks, to feed on the roots of water plants, and other vegetable productions growing at the bottom of shallow waters. Frogs and insects also form a portion of their food.

The Wild Swan, Hooper, or Whistling Swan, as it is often termed, like the species just noticed, is a native of nearly the whole northern hemisphere; but it generally passes the winter in southern regions, extending its flight even to Egypt and Barbary; the Asiatic birds, however, seem rarely to pass much further south than the shores of the Caspian and Black Seas. In America, the range of their migrations is bounded by Hudson's Bay on the north, and Louisiana and the Carolinas on the south. Although the general characters of the wild and tame Swans are similar, there are external and internal differences, which are uniform and constant, and sufficient to determine the species. The bill of the Wild Swan (*Cygnus ferus*) differs from that of the tame species in being destitute of protuberances at its base; and its colours are in a great degree reversed, the black occupying the point and nearly the whole of the bill, its base alone, and the spaces extending from it beneath the eyes, being of a bright yellow; whereas the bill of the Tame Swan is throughout of an orange-red, with the exception of the edges of the mandibles, the slight hook at the extremity, the nostrils and the naked spaces extending from the base towards the eyes, together with the protuberance which rises at the base of the upper mandible, all of which are black.

There is also a remarkable difference in the length and form of the trachea, or windpipe, of these two birds; that of the Tame Swan passes directly from the neck into the cavity of the chest, without forming any previous convolution; whereas in the wild species it enters an appropriate cavity in the keel of the breast-bone, within which it passes to a considerable depth, then returns upwards, and is again inflected over the sternum before plunging into the chest. The Wild Swan has twelve ribs, the tame only eleven.

Wild Swans fly with great rapidity when proceeding in the direction of the wind, but make little progress across or against it. They are much sought after for their flesh, quill-feathers, and down. In Iceland and Kamtschatka they are hunted in July and August, the moulting season, with dogs and horses. They frequently distance the latter, but are eventually taken by the dogs. The female usually builds on an open island in the centre of a lake, and lays from five to seven eggs, of a dirty white with a shade of olive-green. The males are often urged to desperate contest with each other, which, after continuing sometimes for a whole day, generally ends in the death of one. Though not very pugnacious, they are resolute in driving away intruders in the precincts of their nests, and they will attack any animal that approaches, and even man himself.

The Whistling Swan is generally distributed over the north parts of the eastern and western continents. In some winters they pass to the south in small flocks, to fresh waters near the coasts both in England and France, but seldom reach the south of Europe, except when the storms of winter are more than usually general and severe. As soon as they begin to feel the influence of spring, they collect their scattered parties, and retire to regions further north to spend summer, and rear their broods. There are said to be vast numbers in all polar countries, Siberia, Lapland, Iceland, America, and especially in countries near Hudson's Bay, and in Greenland.

They avoid mountainous districts, resorting only where there are lakes or rivers of some magnitude. On their migratory flights they rise high in the air, and follow close on each other. Their flight on these occasions is much more rapid, than from the size and weight of the bird, might be supposed.

Mr. T. C. Eyton, in his monograph of the *Anatidæ*, arranges the Canada Goose, or Cravat Goose (*Anser Canadensis*), of authors, under the genus *Cygnus*, Pennant, Wilson, Audubon, and others, give very interesting accounts of the habits and chase of this species, whose annual advent furnishes such an abundant harvest of food and profit to the residents in the countries visited by it; not only Indians, but the English settlers also, depend greatly for subsistence upon these birds, many thousands of which are annually killed, and a large proportion salted for winter consumption. The passage of the geese to the north begins with the breaking-up of the ice, their appearance in Canada and on the shores of Hudson's Bay varying with the spring, from the middle of April to the latter end of May. The period of their arrival is called the goose-moon by the Indians. Their flight, says Wilson, is heavy and laborious, generally in a straight line, or in two lines meeting in a point. In both cases the van is led by an old gander, who every now and then pipes his well-known *houk*, as if to ask how they come on; and the *houk* of "all's well" is generally returned by some of the party. Their course is in a straight line, with the exception of the undulations of their flight. When bewildered in foggy weather, they appear sometimes to be in great distress, flying about in an irregular manner, and for a considerable time, over the same quarter, making a great clamour. On these occasions, should they approach the earth and alight, which they sometimes do, to rest and recollect themselves, the only hospitality they meet with is death and destruction from a whole neighbourhood, already in arms for their ruin.*

When frost sets in they are again in motion with their young broods, and arrive on the coast of New Jersey early in October. Here many remain during winter, frequenting shallow bogs and marshy islands, feeding on the tender green leaves of a marine plant called the sea-cabbage, and on the roots of sedge, which they are frequently observed in the act of turning up, and making occasional excursions to the beach for gravel. They swim well, and dive to a great distance; but, except in very calm weather, rarely sleep upon the water, their roosting-place being mostly in the marshes.

Although commonly known by the name of Canada Goose, these birds are by no means confined to that country, but extend their migrations from the lowest latitudes of the United States to the highest parallels that have yet been visited in the northern regions of America. The entire length of the bird is about three feet, and the expanse of its wings rather more than five. The back and wing-coverts are of a dull brown, with a whitish tip to each of the feathers; the quill-feathers of the wings, rump, and tail black; the sides pale ashy-brown, and the upper part of the head and neck black, with a broad patch of white spreading from the throat on either side, over the lower part of the cheeks. By this latter character, which is extremely obvious, this species may at all times be readily distinguished. Its bill is black; iris dark hazel; legs and feet greyish-black, or lead coloured. There is little or no distinction in plumage between the sexes.

---

* American Ornithology.

There are many varieties in this sub-family, but the habits of most are nearly similar. On the confines of the *Anatinæ* we find the Egyptian Goose (*Anser Egyptiacus*), this species being, it is generally believed, that to which the latter generic name was supplied by the Greeks—Aristotle, Aristophanes, and others.

The male of this species, besides the common character of the Goose, has the bony enlargement at the bottom of the trachea common to fresh-water Ducks, whence Mr. Yarrell considers this bird the connecting link between the two sub-families. It has also the bright colours of the Duck, which are not to be found in Geese strictly so called.

The Egyptian Goose is more than two feet two inches long; bill of a reddish colour; nail black; nostrils dusky, irides pale yellow. A dark reddish chestnut patch surrounds the eye at the base of the bill; crown of the head and cheeks dull dirty white, mixed with indistinct spots of rusty brown; the rest of the head, from the nape downwards over the whole neck, is of a dingy chestnut, mixed and tipped with a lighter colour. There is a reddish chestnut patch on the breast, the upper part of which, with the shoulders, scapulars, and sides, are pale brownish-yellow, beautifully marked or pencilled with dusky waved lines; the lower part is less distinctly marked, and appears of an ash-grey colour; the belly white, as are also the wing-coverts; the greater ones being crossed or barred with a black line about half an inch from their tips. The tertiary quills and lower part of the scapulars are clear reddish chestnut; secondaries rich green glossed with purple; primaries, lower part of the back, rump, and tail black. Vent and under tail-coverts rich buff; legs and feet reddish flesh colour; nails black. Africa is the native country of this species.

The true Ducks, forming the sub-family *Anatinæ*, are distinguished from the preceding by striking characters. Their bills are broader at the base than deep, and in most species of nearly equal breadth throughout; upper mandible hooked at the tip; nostrils placed nearer to the base, and more on the upper surface; cheeks entirely covered with feathers; necks of moderate length; legs short, and placed behind the centre of gravity; the first and second quill-feathers are the largest. There is one very remarkable feature in the plumage of the greater number of these birds, distinguishing them from others of the same family, and adding not a little to their beauty, this is the brilliancy of the colours in a portion of the external web of the secondary quills of the wings, forming the wing-spot, as it is termed. This spot is always different in colour from the surrounding parts, and it is generally glazed with rich metallic reflections, on which account it is designated the speculum, and the beauty spot.

Ducks are more numerous in their species, and more diversified in their characters and plumage, than Geese. They are the smallest of the family, and, taken altogether, perhaps the most interesting and important of the whole. In many the form is extremely elegant; the head being small, the expression mild and intelligent, the colours beautifully varied, and their motions and attitudes upon the water easy and graceful. Their habits, food, and manner of feeding render them far less destructive than the poultry kind, and many may be rendered as tame and fearless as barn-door fowl.

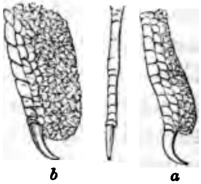
The whole of the Duck tribe find their food more by the sense of touch than sight, and the bill is beautifully organized for this purpose. Except the nail at the point, it is throughout covered by a sentient membrane, and the edges which come in contact are covered with papillæ, and abundantly furnished with nerves. The food consists of the minute animals bred in such profusion along the sides of rivers and fresh water, or on the shores of the northern seas. The bill of the common Duck (*Boschas domestica*) is a good example. Strength of substance in this member, Mr. Swainson observes, is unnecessary, the bill is therefore comparatively weak, but great breadth is obviously essential, from the nature of their food. As those small insects also which constitute the chief food of the *Anatinæ* live principally beneath the surface of the mud, it is clear that the bill should be so formed that the bird should have the power of separating its nourishment from that which would be detrimental to the stomach. The use of the *laminæ* thus becomes apparent, the offensive matter is ejected between their interstices, which, however, are not sufficiently wide to admit the passage of the insect food at the same time. The mouthful of stuff brought from the bottom is, as it were, sifted most effectually by this curiously shaped bill, the refuse is expelled, but the food is retained. It is probable also that the tongue is materially employed in this process; for, unlike that of all other birds, it is remarkably large, thick, and fleshy. From being so highly developed, it must be endowed with an unusual degree of sensation, and indeed a very exquisite sense of taste must belong to any animal which has to separate its food from extraneous substances, without deriving any assistance in the process from its powers of sight. Against this deficiency nature has wisely provided, by heightening and increasing the senses of taste and touch.*

Ducks are prolific birds, the number of eggs at each hatch being from ten to eighteen. In winter they collect in flocks, and several species arrive on the southern and low shores and estuaries of this island, when driven from northern seas by continued severe weather, and large numbers are yearly taken, chiefly in decoys.

Ducks may be divided into two distinct sections; the first consisting of the sub-family *Anatinæ*, which frequent fresh waters, and are mainly distinguished by the hind toe being of the ordinary shape and free, that is, without a membrane attached to it, as in the common duck (*a*); the second consists of those which live more generally upon the wide waters, and instead of dabbling in the shallows, dive for their food, which consists of fish and other molluscous and aquatic animals more than vegetable matter; and have the hind toe lobed (*b*), or connected to the inner one in front by a membrane of greater or less breadth; this difference in the hinder toe forms the chief distinction between the two divisions.

---

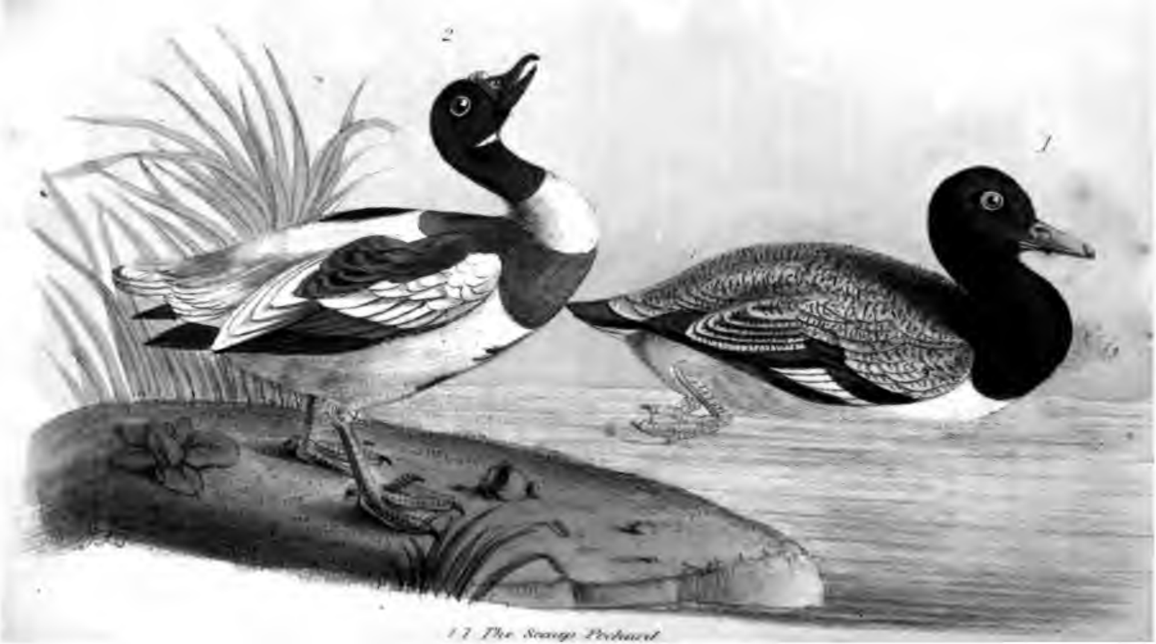
* Journal of the Royal Institution, 1831.



The first division of true Ducks, says Mr. Yarrell, will contain the Shielduck, Muscovy, Wild Duck, Gadwell, Shoveller, Pintail, Widgeon, Bimaculated Duck, Gargany, and Teal, all of which will be found to have the following characters in common. Externally, they exhibit considerable length of neck; the wings are also long, reaching to the end of the tail; the tarsi somewhat round; the hind toe free, or having no pendent lobe. In habits, they may be stated generally as frequenting fresh water, but passing much of their time on land, feeding in ditches, and about the shallow edges of pools, on aquatic plants, insects, worms, and occasionally fish, taking their food at or near the surface; possessing great powers of flight, but seldom diving, unless pursued. Of their internal soft parts, the stomach is in the greatest degree muscular, forming a true gizzard; the intestines long, the cæcal appendages from six to nine inches in length in the large birds, and decreasing only in proportion to the size of the species. Of the bones it may be observed that the ribs are short, extending but little beyond the line of the posterior edge of the sternum; the keel of the breast-bone deep, affording great extent of surface for the insertion of large and powerful pectoral muscles; the enlargement at the bottom of the trachea in all of them is of bone only.

Mr. Yarrell proceeds to state that the Eider Duck, King Duck, Velvet Duck, and Scoter, possessing some characters common to the preceding class, and others belonging to that next in succession, appear to supply the link between these two divisions.

The next division of true Ducks, according to Mr. Yarrell, includes, in the following order, the Red-crested, the Pochard, Ferruginous, Scaup, Tufted, Harlequin, Long-tailed, and Golden-eye Ducks; and their general distinctions, he remarks, internal as well as external, compared with those of the first division, will be found of an opposite character. Externally they exhibit the neck and wings short, the latter only reaching to the origin of the tail-feathers; the tarsi short and compressed; the hind toe lobated, and an extended web to the inner toe. They frequent the sea, or the deep parts of fresh-water lakes, and have been called oceanic Ducks; they are seldom seen on land; their walk is embarrassed, from the backward position of the legs, but they dive constantly and with great facility, taking their prey at various depths beneath the surface; their food consists of finned and shell-fish, and marine insects, but of little or no vegetable production; their powers of flight are moderate. With regard to their soft parts, Mr. Yarrell



1 2 The Scaup Pochard

states that the œsophagus is capable of great dilatation; that the stomach is a muscular gizzard, but that the internal cavity increases in size. The stomachs of the Long-tailed Duck and Golden-eye most resemble that of the Mergansers, whilst the intestines and cæcal appendages are shorter, the latter diminishing from six inches in the first, to four and a half in the Tufted Duck; three inches in the Long-tailed, and but two in the Golden-eye. The ribs of the birds of this division, according to the same author, are elongated; the keel of the breast-bone gradually decreases in depth; the position of the wings is more forward, and the legs are placed further back. The tracheæ of these Ducks, moreover, are particularly distinguished from those of the others by the enlargement at the bottom of the tube being covered with a delicate membrane, supported by slender portions of bone.*

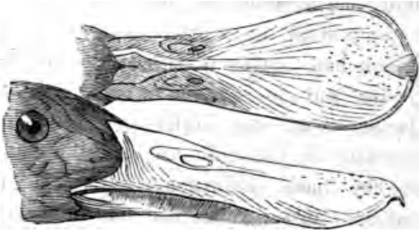
Among fresh-water Ducks that which approaches nearest, both in form and habits, to the *Anserinæ* is the Shielduck, or Sheldrake, as it is sometimes called (*Tadorna Bellonii*); characterised by the base of the bill being considerably elevated, and having a small tumid protuberance rising out of the base of the upper mandible. Its habits assimilate somewhat to those of Geese, and its form is thick and heavy, in comparison with other Ducks. These are handsome birds, quiet, and easily tamed. They inhabit the line of water rather than the fens, or the broad waters; they lurk in holes along the beaches, in which the female deposits her eggs, from ten to fifteen, of a white colour. The females, like the Eider Duck, cover their eggs with down from their own breasts. The Shielduck has a little of the strut and swagger of the Goose, but is a smaller bird, being only a little larger than the Mallard. The feet and greater portion of the bill are of a reddish colour; but the basal enlargement of the bill, the openings of the nostrils, and the nail on the tip are black. The head and neck are of a beautifully rich dark green; the lower part of the neck, back, rump, tail-coverts, and basal part of the tail-feathers are white. There is a band of reddish bay, which forms a collar on the lower part of the neck, and proceeds along the sides and flanks. The outer half of the scapulars and the principal quills are black, and the secondaries glossed with a wing spot of green and purple reflections. In so far as colour is concerned, the Shielduck is one of the handsomest of our aquatic birds. The female resembles the male more than the common Wild Duck species, being only rather less, and not quite so bright in colours.

---

* Linnæan Transactions, vol. xv. p. 373.

In the Shoveller (*a*) (*Anas clypeata*), the bill is considerably enlarged, very much dilated toward the tip, and narrower at the base. It is about three inches long, and the fibres or laminæ of the upper mandible are slender and prolonged beyond the margins, and well fitted for sifting small insects from the water of the shallows, runs of rivers, and marshes, where it feeds. In England, the chief resorts of this species are the fens of Lincolnshire and Cambridge.

Another remarkable feature is developed in the bill of Malacorynchus (*b*), Sw. The edge of the



a

b

upper mandible towards the tip, instead of being smooth, as in the European species, is furnished with a thin membranous skin, which projects considerably, and hangs down somewhat like a wattle on each side. This species belongs to the southern hemisphere.

We now proceed to speak of the form and habits of the second division of the Ducks, forming the sub-family *Fuligulinæ*, or Sea Ducks, as they have been named, although many of them are to be found in the fresh-water lakes and rivers, where the water is deep. In comparison with River Ducks, their plumage is very close and thick, which enables them to withstand the rigours of the northern climes, where they are chiefly found. They swim remarkably well, and excel in diving.

This sub-family is monogamous. The nest is often made near fresh waters, the female alone incubating, though both parents, in several species, strip the down from their breast to cover their numerous eggs.

They chiefly inhabit northern regions, though son varieties are spread over the greater part of th globe. Large flocks migrate periodically, keeping fo the most part the line of coast, flying and feeding usually by night, though often, in hazy or windy weather, by day.

Eider Ducks (genus *Somateria*) are the most noted of Sea Ducks. They are plentiful in the Arctic Sea for the greater part of the year, being only partially migratory, old birds rarely moving further southwards than to permanent open water.

This genus is remarkable for the high development of the extremely soft and elastic down so valuable in commerce, and so essential to keeping up the proper balance of animal heat in the icy regions inhabited by these birds. They are much larger than any of the other Ducks, being as weighty as the average of Geese. The down, which is taken from the nests by the natives, is termed "live down," and is removed several times from each nest. The first batch of eggs, which are very palatable, is generally taken together with the down; and the female strips herself a second time to cover her eggs. If this second batch be taken, the female being unable to supply any more down, the male plucks his breast, and his contribution is known by its pale colour. The last deposit is always left, or the birds would forsake the place. The quantity yielded by one female during the season is half a pound net, weighing nearly a pound before it is cleansed. The districts to which these birds resort are reckoned valuable property, on account of the down they yield, and are strictly preserved, as in Iceland and Norway.

As an article of food also, the flesh of the Eider Duck is used by the Indian and Greenlander, and the skin is converted into a warm inner garment. According to Sir E. W. Parry, the Esquimaux Indians catch these birds with springes made of whalebone, and take the eggs wherever they find them. The skin, prepared with the feathers on, is an article of commerce, particularly with the Chinese. M. Audubon is of opinion that this valuable bird would be a great acquisition if domesticated, both for its down, and its flesh as food. When in captivity it feeds on different kinds of grain and moistened corn-meal, when its flesh is excellent.

The King Eider (*Somateria spectabilis*) is made remarkable by the development of two prominent lobes at the base of the bill, which are much compressed and elevated. The colour of the bill and feet is a bright reddish orange, but the terminal parts of the plates towards the forehead are black; the feathers over the eyes, at the base of the bill, and partly down the sides of the neck, are bright green, meeting in front, and gradually passing into whitish on the chin, which is marked with an angular bar of black; the top of the head and back of the neck are ash coloured; the middle of the back black; the coverts dusky, with a patch of white in the centre; the quills black, and the tertiaries curled over them; the tail, which is short and wedge-shaped, black, as are also the belly and vent, but the lower neck and vent are whitish. The female is smaller, of a brown and dusky colour, has the plates of the bill less conspicuous, and the tertiaries not curled over the wing.

Few Ducks exceed the Pochard (*Fuligula*) in the delicacy of their flesh. The Red-headed Pochard (*Fuligula ferina*) is a winter visitant to the British Islands, being driven from the northern regions by the intense cold at that season. It is known in some localities as the Red-headed Widgeon, and the Dunbird, from some of its colours, which may thus be described:—The head and neck of the male is rich chestnut; the lower part of the throat, breast, and upper part of the back are black, marked with fine undulated lines of grey; the back and scapulars are marked in the same manner, with cinereous and dusky lines; smaller wing-coverts the same, but darker; greater coverts and secondaries blue-grey; primaries cinereous grey; rump and under tail-coverts black; under parts of the body dusky white, faintly undulated with zigzag dusky lines, which are blackish at the vent; tail-feathers fourteen, and coloured like the wings; bill and feet bluish-grey; the tip and base of the former being black. The colours and markings of the female are less decided and distinct. The weight of this Duck is about a pound and three quarters; its length nineteen inches, and the extent of its wings about thirty.

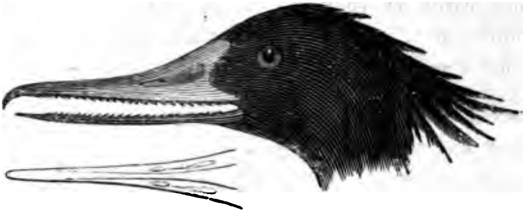
The Pochard is a remarkably good diver, swims very rapidly, and flies swiftly in a compact flock, differing in this from the generality of ducks, which fly in a triangular form. It seems naturally to prefer fresh-water lakes, rivers, and marshes; but occasionally is found on the sea-shore, near the mouths of rivers. Mr. Selby says that it breeds among aquatic herbage, laying twelve or fourteen eggs of a greenish-white colour. It becomes very tame when in confinement, and is soon reconciled to its new abode.

The genus *Clangula*, or Garrots, have their bill short, narrow, elevated at the base, somewhat attenuated at the anterior extremity, and rounded. Nostrils nearly central. Wings short. They are birds of high northern latitudes, resorting to the northern parts of the Atlantic, and therefore plentiful on the shores of America. They are rather small in size, but very active in their motions. There are two or three species; that which we select in illustration of the genus is the Buffet-headed, or Spirit Duck (*Clangula albeola*), usually known in America by the name of Butter-box or Butter-ball.

During autumn and winter this pretty Duck is found in all parts of the United States. It frequents rivers and fresh-water lakes. They are by no means shy, allowing a near approach of the sportsman; but at the flash of a gun or the twang of a bow, they dive so suddenly that they are seldom killed. Hence they are called "conjuring duck," and "spirit duck," by the natives. It dives with such facility, and secretes itself in such an artful manner, after it has disappeared from the surface, that it is rarely seen a second time after being shot at. Should a bird be hit, but only wounded, it can seldom be captured, so quick is it in avoiding the shot altogether, and so dexterous in evading its pursuer. The flesh is not in high repute, but the females and young are said to be tender and well-flavoured. In winter they become extremely fat, which has given rise to some of its familiar names.

Mr. Swainson observes, that as there is evidence to show that the food and economy of this species are essentially the same as those of the common Golden-eye (*Clangula vulgaris*), it might probably be as much domesticated as that is. Both breed in the same regions; but, in their southward migrations, this species seems to confine its range to the American continent.

Divers.

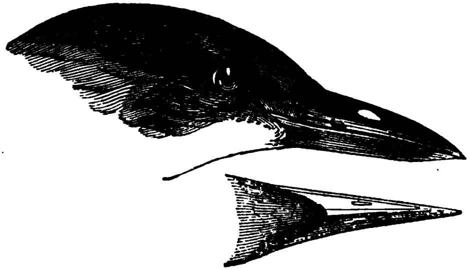


By the *Merganidæ*, which exhibit a peculiar modification of the bill, adapted for seizing prey in the water, but not at the bottom, as with Ducks, we are led to the next family of water-birds, viz., the Divers (*Colymbidæ*). The bill of the Merganser, as in that of the Red-headed species figured in the cut, is straight, slender, cylindrical, hooked at the point; the margins of each mandible serrated with reflected teeth, thus enabling the birds to retain a firm hold of their finny prey. The legs are short, and the toes fully palmated; the exterior toe being the longest. The position of their legs, which is far backward, the form of the wings, and the great enlargement of the lower part of the trachea, all adapt them well for diving in quest of food. They do not exhibit any of the dabbling characters of the true Ducks, and their internal structure indicates that they feed more exclusively upon animal matter.

The *Colymbidæ* is a remarkable though not very extensive family, and forms the first sub-typical grou natatorial birds. It includes the Grebes, Divers, a Guillemots. They exhibit characters more exc sively aquatic than Ducks. Except the first, they a all marine birds, with a narrow, straight, shar pointed, strong bill; a small head, and, in general short wings. Their feet being placed far backwards, they have an awkward gait on land, but great facility in diving; the legs are broad and flat, being very much compressed laterally; and the toes are terminated by very broad fat claws. Some of the species have the toes lobed, or margined with lateral membranes, and are without a tail; others have the toes entirely webbed.

We enter the family by the genus *Podiceps.* The great difference between the bills of the Duck tribe and of the present family is softened down by the intervention of that of *Mergus,* which is intermediate between the broad and depressed bill of *Anas,* and the narrow and sharp-pointed bill of *Podiceps.* There is a great deficiency in these birds in the faculty of walking, as well as in the powers of flight. These deficiencies are, however, compensated by the capability of remaining long under water, and by superior powers of diving. For this latter purpose the structure both of their wings and legs is admirably adapted; the former, by their strength, assisting them as oars under water, and by their brevity not interfering with their progress; the latter, by heir compressed and sharpened edge, offering no esistance to the water as they are drawn up to effect he stroke which accelerates the movements of the bird. From their superiority in these characters and powers, the birds themselves have obtained, *par excellence*, the name of *Divers*. In these particulars we may observe them to be united with the *Alcadæ*, which succeed them, and from which they are chiefly separated by the presence of the hind toe, conspicuous here, but deficient in the Auks.[*]

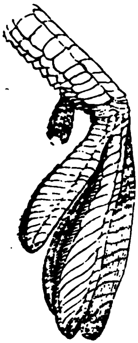
In the genus *Podiceps* the chief peculiarity is the construction of the foot; it may, however, be observed that the eyes, as in most of the Divers, are placed at but a short distance from the base of the bill, and are directed forwards; they are small, but possess acute sight. The absence of a tail is another peculiarity in these birds. Although they have difficulty in rising into the air, yet, when once elevated, their flight is rapid, and well sustained. In the form of their body, the position and structure of their feet, and the nature of their plumage, the Grebes are expressly fitted for the element in which they habitually reside, and in which they chase their prey with arrow-like velocity. The head is narrowed forwards; the beak rather long, pointed, and sharp, somewhat compressed



---

[*] Trans. Linn. Soc., vol. xiv. p. 502.

at the sides, and slightly inclined upwards towards the tip. The neck is long, the body boat-shaped, and flattened; the wings short, concave, and pointed. The plumage is thick, full, and soft; a dense layer of fine down forms an under-dress, being covered by feathers of a silky gloss and texture, and completely waterproof. The toes differ from those of every other aquatic race of birds. Instead of being webbed, as in the Ducks, and other of the natatorial order, they are completely separate, and flattened, having their edges furnished with a broad stiff membrane, each toe being, in fact, a distinct and beautifully formed paddle. Of the three anterior toes, the outermost is the longest and largest; the next is nearly as large, and the inner toe is less than the middle one. The hind toe is short, placed high on the tarsus, and furnished with a lobated membrane. The tarsus is short, and flattened laterally, so as to cut the water when drawn up after each stroke.



Considerable advantage is gained by diving birds by the exterior toe or paddle being longer than the rest. By this means the impetus of each stroke of each foot is carried in a line obliquely forwards to the anterior part of the chest, to which it converges; whereas, if the interior toe were the longest the line of the impulse would diverge from the body, and consequently there would be a waste of power, with a proportional loss of speed.

The legs are articulated so far backwards, that they cannot support the axis of the body in a horizontal position upon land: the Grebes accordingly walk with the spine nearly erect; they walk with difficulty, and are never found far from water. There is a rolling motion, besides, in the tarsal and tibial joints, which is an additional cause of these birds being bad walkers. The looseness of these articulations, however, enables the bird to strike with its feet in a variety of directions, and thus impel the body in any course which may be necessary in pursuing its prey in the water. The wings also come into action in swimming under the surface, though rather as points of support against which the legs act, than as propelling organs. These birds do not dabble like Ducks, but plunge freely into the water, and dash along, not by alternate strokes of the feet, as in a common walking motion, but by striking with both at once, as a frog does. It is to enable them to perform this motion that the wings are brought into action as well as the feet, and the same kind of motion could not be performed, and the intended course kept, without the wings.*

Salt waters, as well as the fresh of rivers and lakes, are frequented by these birds. Their plunging propensities, and the quickness with which this action is performed, is well known to those who have watched the Dab-chick, or Little Grebe (*Podiceps minor*), which is so common, during the winter months in particular, in this country. They feed on small fishes, frogs, crustacea, and insects, and their nests are formed of a large quantity of grass, roots, etc., and are generally placed among reeds and sedges, which border fresh-water lakes and rivers; they are generally so constructed as to rise and fall with the water. Five European species are enumerated, and there are many foreign species. Several species are ornamented in the adult state with ear-tufts, occipital crests, or throat-frills. These ornamental plumes, it is believed, are only assumed during the breeding season.

---

* Mudie.

The five species of Grebe which are ranked among British birds are the Crested Grebe (*Podiceps cristatus*), the Eared Grebe (*P. auritus*), the Horned Grebe (*P. cornutus*), the Red-necked Grebe (*P. rubricollis*), and the Little Grebe, or Dab-chick, before mentioned.

The latter is the smallest and most interesting of the group; but small as it is, it possesses all the characteristic powers of its genus in full perfection. It resorts to ponds and small lakes fringed with reeds, the dense herbage of which offers it a friendly shelter. Should the least noise or any motion betray the presence of an intruder on its quiet domain it disappears in a moment; and if hunted by dogs, or other persevering enemy, it will remain under water, the bill alone being elevated above the surface. During winter it leaves its inland haunts, and betakes itself to the mouths of rivers, and small retired bays or inlets along the shore, where it feeds upon the fry of fishes, shrimps, and marine insects. The Dab-chick seldom or never comes to land.

As an illustration of the sternal apparatus of these birds, we give that of the Eared Grebe, from Mr. Mudie's figure, the species being a diving bird, as well as a surface swimmer.

Differing but little from the Grebes, except in their feet, which in the present group are palmated, the true Divers, forming the genus *Colymbus*, take us another step towards the more typical groups of water birds. Like the Grebes, when on the water they are at ease; but on land, owing to the very backward articulation of their legs, they are awkward, and beset with difficulties in their locomotion. They appear in structure and in habits to be made for the water, and that only; and they have equal command of themselves on and beneath its surface. The form of the body is long and flat, the breadth being greater than the depth. The head and neck are comparatively slender, the former gradually fining off into a strong and sharp bill, which answers equally for seizing the prey or transfixing it by a thrust. The tarsi are compressed, as in those of the Grebes. The three front toes are very long, and webbed to their points; the hind toe short, and united to the inner one by a rudimental web. The wings are short, but their plumage is remarkably close and compact, as is that of the whole body, which thus presents a smooth and almost solid resistance in passing through the water. They are chiefly inhabitants of the arctic regions, in the northern hemisphere, and feed upon fish, small marine animals, and sometimes vegetables.

Auks and Penguins.

In the typical family of water birds, *Alcadæ*, are included the Guillemots, Auks, Puffins, and all those singularly constructed groups where the wings are abortive, or, in other words, assume more the appearance, as they perform the office, of fins. Some of the species are incapable of raising themselves in the air, and equally incapacitated for making any progress on land; but although in every other faculty these birds may appear the most imperfect in creation, their powers of swimming are far greater than those of any other bird. Some of the species are very large birds, such as the true Penguins, whose feathers lie so close on the body as to appear like scales; and the feet placed so far backward, that when upon land the birds stand nearly erect, and walk with the greatest difficulty. When in water, however, they swim and dive with the utmost ease, and, with the rapidity of a fish, springing several feet (observes Mr. Swainson) over any object that may impede their progress, and then once more pursuing their course. One species, the *Aptenodytes chrysocoma*, of Van Diemen's Land, is stated to proceed on land by leaps or bounds, rather than by walking. On the whole, continues the same writer, these are the most singular of all aquatic birds, and clearly point out that nature is about to pass from birds to fishes.

The generic characters of the family are — Bill, with the culmen more or less arched, sides compressed. Feet entirely webbed, and placed very far backward; hinder toe minute, or wanting. Wings moderate, or altogether destitute of quill-feathers.

We enter the family by the genus *Uria*, or Guillemots, originally included in that of *Colymbus* of Linnæus, but from which it has been separated, chiefly on account of the tridactyle conformation of its foot. The generic characters are —Bill moderate, robust, straight, acute, and compressed; upper mandible slightly curved towards the point. Nostrils basal, lateral, concave, longitudinal, half shut by a large membrane, covered with feathers, advancing on the bill. Feet short, plunged as it were in the abdomen, so that the lower end of the tibia only is perceptible, and placed beyond the equilibrium of the body, very far back. Toes, three only, all placed forward, and entirely webbed. Nails compressed, rather curved and sharp. Wings short, narrow, and acute; the first quill largest. Tail very short, rounded.

Arctic and polar regions are the localities these birds love to haunt. There they may be seen in swarms on the rocks and islets that are buffeted by the roaring tide. In the short but bright summer that gilds some of their northern haunts, they make haste to deposit their eggs, sometimes only one, on the bare rock, without wasting the precious day in making a nest. On the naked ledge that overhangs the sea, the young Guillemot is hatched, and, as soon as it is able to bear the shock, is conducted, or rather tumbles, from its hard nursery into the bosom of the ocean, where a plentiful harvest is prepared for it. Here the Guillemots are indeed in their element; plying their way with wings and feet beneath the waves, and even beneath the ice, they make prey of small fish and crustacea, which form their principal food. Their native rocks, or ice-caverns, shelter them from the storm, and it is only when the winter is more than hyperboreally severe that any number of these birds are driven to a temporary resort to more temperate climates. Their flight is short and rapid, though of no long duration, and generally directed just above the surface of the sea.

Uria Troile, sometimes known by the name of Foolish Guillemot, from the fact that they occasionally allow themselves to be taken by the hand, is by no means a rare bird along the rocky shores of the British coast. Early in April or May, or in some seasons, at the end of March, these birds begin to assemble on their favourite cliffs in Britain, and lay their single egg on a flat bare ledge of rock. The egg is generally of a pale green, blotched and stained with black and dark umber-brown. Sometimes the egg is white, with or without a few spots. It is a remarkable sight to see these birds, where they abound, sitting upon their eggs on their rocky shelves, often in line, and so close that they nearly touch each other. As soon as the young are capable of migrating, which is in August, or by the end of that month, they are said to disappear from our shores, but it is probable that some few, about the southern shores at least, remain throughout the winter.

By another step in advance we are conducted to the genus *Mormons*, or Puffins, some species of which are characterised by the singular form and size of their bill. Though these birds' wings are sufficiently developed to support them in air, they are very small, and but seldom used for flight. Still they help materially in the act of diving, constantly performed to procure food. Puffins seldom leave water but for the purpose of reproduction. Their generic characters are thus described by Mr. Swainson:—Bill short, very high; the sides generally sulcated; the culmen strongly arched, the tip hooked, and the gonys ascending. Wings and tail very short; the former capable of flight.

The Common Puffin (*Mormon arctica*), a well-known species, is an example of the genus. It is a summer visitor to many parts of the British coasts. Although its peculiar bill is of considerable power, it does not appear to be employed in the capture of large fish. Its chief food is smaller crustacea and shelled mollusca. These birds arrive on our rocky coasts in April, and breed during the month of May. They deposit their single white egg in holes and crevices in lofty cliffs, or in burrows, if the soil be light where they resort. Mr. Selby says the hole is excavated to the depth of three feet, and often in a curving direction. About the second week in August the young birds are fully fledged, and follow their parents in their equatorial migration. It is not till after the second year that the bill obtains its full development of colour, size, or markings.

Intermediate between the Puffins and the Penguins is the Great Auk (*Alca impennis*). It is chiefly remarkable for the imperfect development of its wings, which are only about four inches long, the bird itself being about the size of a goose. Water is its element. It cannot rise in the air, nor walk on land. Its wings are solely used as paddles or fins to guide its course through the water. The bird cannot move or even balance itself upon its feet without bringing the whole of the tarsi to the ground, and thus it shuffles along in a very awkward manner, flapping its wings, with a wriggling gait. It can, by the help of its bill, drag itself above the level of the water, but the operation is one of apparent labour, and no little time. In water it is "at home," and dashes along with the ease and velocity of a fish.

In the species which now comes under our notice, we learn the full development of the peculiar modification of character required by an exclusively aquatic bird. There is not a more helpless bird on land, or in any other situation but in water, than the Penguin, genus *Aptenodytes*. The Great Auk, we have seen, is incapable of flight, and its progress on land is effected with difficulty. Its wings, however, are feathered, and have the appearance of wings, but those of the present group have no quills at all upon them, and merely rudiments of feathers, which assume the appearance of narrow scales, lying on each other like the true scales of a fish. They serve as paddles in aid of the bird's progress beneath, and on the surface of the water, and in its other aquatic movements. The legs are placed so far backwards, that when the Penguin does stand upon land it is in nearly an erect posture. The tarsus is so short, as almost to be confounded with the sole of the foot; and it is probably rested upon the ground for its whole length, Mr. Swainson observes, when the bird walks, just as in the bear and other plantigrade quadrupeds; it is also remarkably broad; the hind toe is placed in front, and on the inner margin; but it is so unusually small that, but for its short but well-defined claw, it would not be perceived. The whole foot is remarkably flattened, being nearly twice as broad as it is thick, as if to enable the bird to cover a greater breadth of ground than ordinary.*

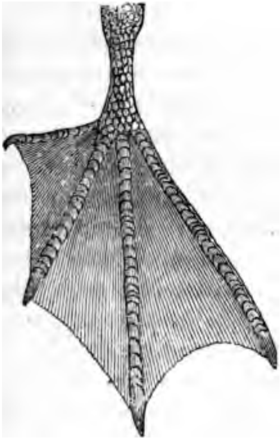
The feathers of the Penguin are so compact, and lie so close to the body, that they have the appearance of scales; and the form of the body altogether is not very unlike that of a fish. The bird dives and swims beneath the surface with as much facility as a swallow cleaves the air; and is capable of leaping from the water to the height of several feet, to clear any obstacle that might present itself in its course. When swimming on the water, the body is immersed above the breast, so that the wings are thus enabled to act as paddles to assist and guide its movements.

Water is the element for which this bird is solely adapted, and its whole existence is passed in it. So helpless is it out of its proper element that, when surprised, it is incapable of making its escape from danger. They feed voraciously upon fish, and are extremely fat.

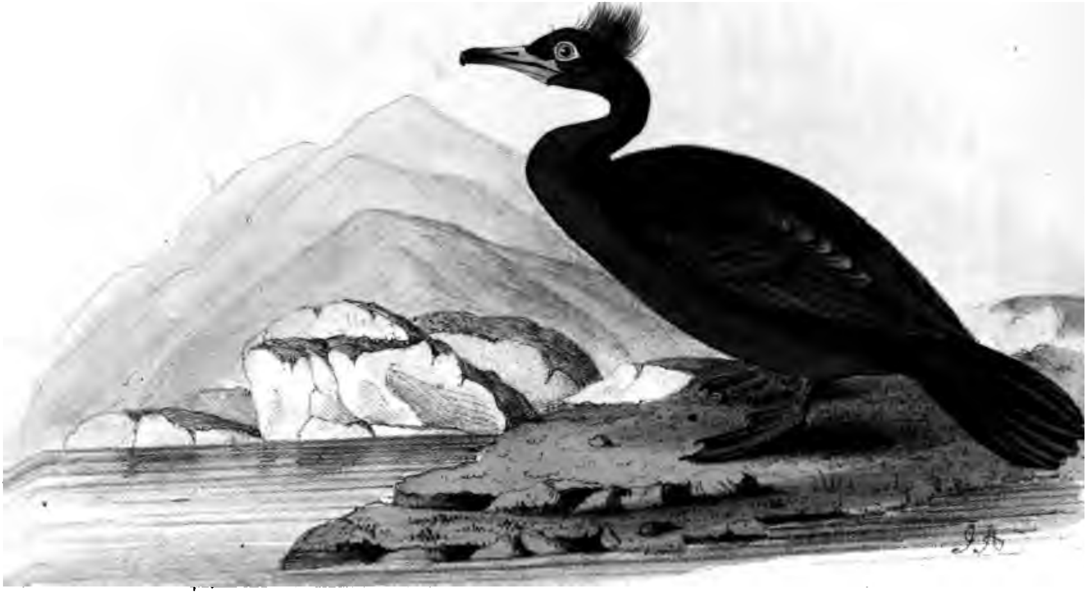
---

* Classification of Birds.

Pelicans.



The principal characters which distinguish the family *Pelicanidæ* from all others consist in the junction of the hinder toe with those in front by membrane; in the length of the bill, which is usually abruptly and strongly hooked at its termination, and being provided in many species with an extensible membranous sac or bag, along the under mandible, or at the orifice of the gullet; in the face being more or less naked, the wings very long, and the feet exceedingly short. Besides the Pelicans, the Gannets, Darters, Frigate-birds, and Cormorants are included in this family. They are all fishers, and dart down upon their prey from a perch, or from a considerable elevation in the air, almost perpendicularly, with astonishing certainty and velocity. The fish is seized by the bill, and the bird reascends with its booty. The broad surface which the expanded foot opposes to the water assists materially in this action of rising from the water. As



a provision against any injurious effect from these headlong plunges, the Gannet is supplied with three great air-cells between the integuments and the muscles on the breast and throat; when the bird dashes down at a fish, says Mr. Mudie, the air in these cells breaks its fall, acts like a parachute in preventing it from going too deep, and assists it in recovering its position, in order that it may remount the sky. This quantity of air is, of course, condensed by the collision; but when that is over, it expands and raises the anterior part of the body, and at the same time throws the centre of gravity further backwards, or more in a line with the feet. These at the same time press downward with their curious webs, both brought under the body by the position in which the toes are articulated on the tarsi, and so heave the body upwards, in the same manner, or at least upon the same principle, that ordinary swimming feet impel the body of a bird forward. Thus, what with the action of the air, and what with that of the feet, the bird is able to regain the wing without any difficulty.*

In the bills of the various genera belonging to this family there are several modifications of form, some being exceedingly sharp pointed, and acting as spear-points whereon to transfix the prey, and others being terminated by a strong hook or nail; but they are all adapted for securing fish, the peculiar food which they are appointed to devour.

Of the genus *Carbo*, the Common Cormorant (*C. cormoranus*) is a well-known species on our shores. Where there are inland lakes not far from the coast, they may sometimes be seen perching on the trees in their neighbourhood; but an open sea, where there are high rocks, is the locality best adapted for these birds; for, as they cannot take wing very readily, owing to the shortness of their legs, they glide off from the top of the rocks in a downward direction, and can watch the approach of the shoals from their elevated position, or dry their plumage after immersion in the water. Their prey consists wholly of fish, which they seize by the middle with their bill; and should it be too large to be swallowed at once, or in a position unfavourable for passing the gullet, it is carried on shore or to the branch of a tree, tossed into the air, and caught, as it descends head foremost, in the bill. When the fish is too large to be swallowed entire, they hold it by the feet, the middle claws of which are toothed or serrated, and thrash and tear it in pieces. Fish of no mean size, however, can be swallowed by these birds, as the gullet is capable of considerable distension. They are birds of social and gregarious habits, though remarkably shy and wary. They are often observed by dozens together, sitting on an elevated ridge of rock, in a state of moping quietude, or with their wings expanded and drooping by their sides, as if to dry themselves. They pursue their fishing with peace and good order, and never interfere with or annoy any other birds.

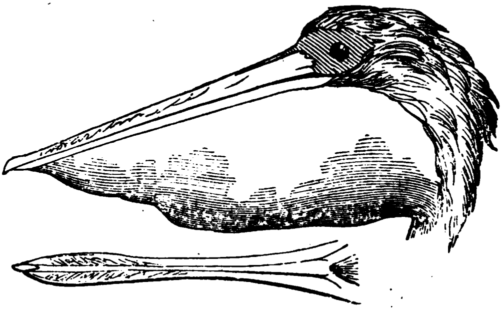
---

* Natural History of Birds.

There are few more interesting birds than the Frigate Pelicans, genus *Tachypetes;* their history, as well as the structure of their frame, is highly remarkable. They are truly rapacious birds, says Swainson, endowed with a sight remarkably piercing, with an immense expanse and power of wing, and with the most determined audacity. They soar to such a height that, notwithstanding their size, they appear as specks in the firmament; all their powers of motion are concentrated in their wings, for their feet are so small and imbecile, that they are of little use in enabling the bird to rise from the ground. The tarsi, which are scarcely half an inch in length, are covered with feathers, and the toes connected by a small membrane only. The tail is long and forked, and particularly adapted to enable them to fly with grace and swiftness, and to remain motionless in the air. Their whole conformation, indeed, declares them to be birds of the air; and that not over the land, but over the wide bosom of the ocean, where alone they find their food, by chasing other birds and compelling them to disgorge their prey, which they seize as it falls. They can neither swim nor dive, nor are they able to rest upon the water like the Gulls, but are apparently only capable of resting upon the summit of some pointed rock, from whence they may glide with ease. They are ever on the wing. There is a pouch attached to the throat, which is expanded when the birds wish to rise in the air. Their plumage, not coming in contact with the water of the ocean, is deficient in that close and downy texture which always characterises a bird whose habitat is the surface of the deep; the oil-gland is also wanting.

Almost all the birds of this family are characterised by some remarkable peculiarity of structure, and differ considerably, both in form and habits, from the generality of water birds. The elongated necks and pointed bills of the Darters are striking features in the genus *Plotus*, only two species of which are known; the one being common to both continents of America, and the other a native of India, Africa, and the South Seas. Their economy is in a considerable degree arboreal, and they dive with great dexterity. They are capable of darting out their snake-like neck with great force and rapidity, and of suddenly withdrawing it again, somewhat in the same manner as the Herons.

Of the true Pelicans there appear to be three or four species, all remarkable for the enormous size to which the skin of the throat and the membranous portion of the lower mandible can be expanded. It is, however, such a well-known form, from the frequent appearance of the bird in menageries, that any detailed notice of its characters is unnecessary. Pelicans occur in the warm regions of the world rather than the cold, though they are likewise found in northern latitudes. They haunt the rivers, lakes, and coasts of the sea. They are excellent swimmers, and although their flight



is wavering, owing to the lightness of their bodies, the bony structure of which is capable of receiving a large quantity of air, they are powerful on the wing. They are large birds and bulky in appearance, yet they rise with facility from the water, even with a load of fish in their pouch.

All the known species bear considerable resemblance to each other, and, when full grown, the sexes are nearly alike. The young are of a darker colour than the adults, and the plumage changes gradually for a year or two, until it attains (in the white species) the pure white of maturity. This species, *Pelicanus onocrotalus*, is the best known.

Audubon gives the following account of the Brown Pelican (*Pelicanus fuscus*). The flight of the Brown Pelican, which is a constant resident in the Floridas, though to appearance heavy, is remarkably well sustained, that bird being able not only to remain many hours at a time on the wing, but also to mount to a great height in the air to perform its beautiful evolutions. Their ordinary manner of proceeding, either when single or in flocks, is by easy flappings and sailings alternately, at distances of from twenty to thirty yards, when they glide along with great speed. They fly in an undulated line, passing at one time high, at another low, over the water or land. When the waves run high, you may see them "troughing," as the sailors say, or directing their course along the hollows. While on wing they draw in their head between their shoulders, stretch out their broad, webbed feet to their whole extent, and proceed in perfect silence. When the weather is calm, and a flood of light and heat is poured down upon nature by the genial sun, they are often, especially during the love season, seen rising in broad circles, flock after flock, until they attain a height of perhaps a mile, when they gracefully glide on constantly expanded wings, and course round each other, for an hour or more at a time, after which, in curious zig-zags, and with remarkable velocity, they descend towards their beloved element, and settle on the water, on large sandbars, or on mangroves.

This species procures its food on wing, and in a manner quite different from that of the White Pelican. A flock will leave their resting-place, proceed over the waters in search of fish, and when a shoal is perceived, separate at once, when each, from an elevation of from fifteen to twenty-five feet, plunges in an oblique and somewhat winding direction, spreading to the full stretch its lower mandible and pouch, as it reaches the water, and suddenly scoops up the object of its pursuit, immersing the head and neck, and sometimes the body, for an instant. It immediately swallows its prey, rises on wing, dashes on another fish, seizes and devours it, and thus continues, sometimes plunging eight or ten times in a few minutes, and always with unerring aim. When gorged, it rests on the water for a while; but if it has a brood, or a mate sitting on her eggs, it flies off at once towards them, no matter how heavily laden it may be. The generally received idea that Pelicans keep fish or water in their pouch, to convey them to their young, is quite erroneous. The water which enters the pouch, when it is immersed, is immediately forced out between the partially closed mandibles, and the fish, unless larger than those on which they usually feed, is instantly swallowed, to be afterwards disgorged, for the benefit of the young, either partially macerated, or whole, according to the age and size of the latter.*

This species builds its nest on the tops of mangroves. It is a large structure, made of sticks, roots, and withered plants. The birds build in societies; they do not care how many nests are on one tree, or how near the trees are to each other. They are extremely silent birds; but when excited, they utter a loud and rough grunt, which is far from musical.

The Gannets (*Dysporus*) and the Tropic Bird (*Phæton*), two interesting genera, belong to this family. The latter is confined to tropical regions, and is remarkable for the length and slender proportion of the two middle tail-feathers. The former are well-known birds on some of our shores, where they are seen in thousands, collected together on the tops of rocky islets a little distance from the land, and giving to them the appearance of being capped with snow. These birds have the bill entirely straight; stout at the base; compressed towards the point, which is slightly curved; edges of both mandibles somewhat serrated. The face and throat naked. Feet short; nail of the middle toe serrated.

Gannets are provided with numerous external as well as internal air-cells, which facilitate descent upon their prey, and enable them to rise again on buoyant wings with their prey aloft. We will not enter into the peculiar characters and habits of these birds, but proceed to the consideration of the *Laridæ*.

---

* Ornithological Biography, v. 4.

Gulls, Terns, etc.

The *Laridæ* form the last and most aberrant family of the natatorial birds.

That there is a close resemblance in habits and propensities between some of the Gulls and Laridæ, and the aberrant family of raptorial birds containing the Vultures, is evident. The Gulls, indeed, have been termed the Vultures of the sea, as the Vultures are called scavengers of the land. Both are greedy devourers of all kinds of garbage and nauseous food, of decaying animal substances, and other refuse cast from the water or polluting the land. As the Vulture, when attacked or pursued, vomits out the contents of its maw, so does the Gull disgorge a portion of its lately swallowed food when seized by an enemy. Many of them are social birds, and flock together in large numbers, particularly when attracted by the effluvia of some forbidding food.

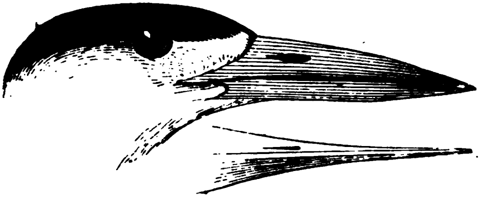
The mode in which the nostrils are developed and protected in some species, as in the Petrels, seems to indicate a keen scent, which Vultures are believed to possess, and the quality of their food induces the belief that such is the case. The Gulls are powerfully winged, take a lofty flight, and some are by no means destitute of courage. In calm weather and sunshine, at all seasons, the Tyrant Gull is found soaring to a great height, where it flies about leisurely, and with considerable elegance, for half an hour or so, in the manner of Eagles, Vultures, and Ravens. It is very voracious, and devours all sorts of food, excepting vegetables, even the most putrid carrion, but prefers fresh fish, young birds, and small quadrupeds, whenever they can be procured.*

Other circumstances also tend to show the close affinity between the Gulls and the Vultures, and the aberrant nature of the former in their own order. The legs of the Gulls are longer and more slender than those of water birds in general, and are naked above the tarsal joints. These birds do not possess that facility of swimming and diving which is so conspicuous in most water birds; they are rather birds of the air, reposing only upon water, and walking with considerable ease upon land, though their toes are webbed. The hind toe is very small, in some species not developed at all. The bill, in most, is slender, much compressed, and gradually, but not abruptly bent. In certain states of the weather, and certain seasons, many Gulls migrate inland, and seek for food on newly ploughed lands along the coast. They are often met with far away from land; some of the genera being seldom seen upon land at all; and others being so constantly on the wing, that their wandering habits are proverbial. They are all capable of withstanding the severest tempests, and are very generally distributed all over the world.

On the confines of this family we find the Terns (*Sterna*), or Sea Swallows, as they are termed, from their length of wing, forked tail, and consequent great command of the air. They have remarkably slender bills and very short feet. Their generic characters

---

* American Ornith. Biog.



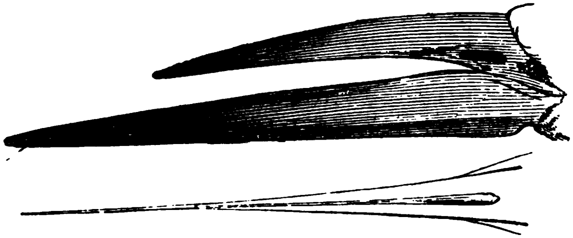
may thus be described:—Bill as long, or longer than the head; straight, and slender, and compressed. Nostrils basal, linear, and pierced through the upper mandible. Feet small and weak, naked to some distance above the tarsal joint. Tarsus much shorter than the middle toe. Wings very long, the first quill being the longest. Tail more or less forked. Some of the species frequent inland waters, and feed upon small fish, insects, and other little creatures which are found about marshy places; others are more of sea birds, and deposit their eggs upon the sands and flats, and especially the small islets near the shores, and in the estuaries of rivers. The mode in which they seize their prey displays a surprising keenness of vision, and wonderful agility on the wing. They often dart perpendicularly down upon their prey whilst in forward flight, just tip the surface of the water, seize the food, and immediately ascend again. Their flight is performed with grace, rapidity, and freedom; and they are admirably shaped and organized for this function. Their strength and weight are concentrated in the wings; and as the feet have only a secondary function to perform, they are small, and the muscles attached to them are very feeble. They are, however, able to walk, and also to swim, but flight is their principal motion. The plumage of these birds is remarkable for the compactness of its texture and the smoothness of its surface, so that the tempest has but little effect on it.

Beautiful indeed are Terns of every kind, says Audubon, but the roseate (*Sterna Dougallii*) excels the rest, if not in form, yet in the lovely hue of its breast. I had never seen a bird of this species before, and as the unscathed hundreds arose and danced, as it were, in the air, I thought them the Humming-birds of the sea, so light and graceful were their movements. Now they flocked together and hovered over us, again, with a dash, they plunged towards us in anger; even their cries of wrath sounded musical, and although I had carried destruction among them, I felt delighted.

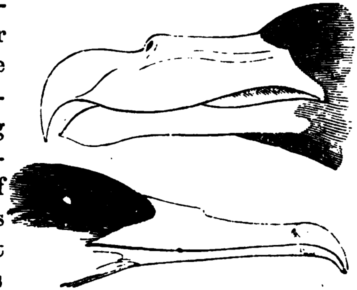
The roseate Tern spends the breeding season along the southern shores of the Floridas, in considerable numbers. They breed in flocks of twenty, thirty, or more pairs, on small detached rocky islands. It is at all times a noisy, restless bird, continues Audubon; and on approaching its breeding place it incessantly emits sharp, shrill cries, resembling the syllable *crăk*. Its flight is unsteady and flickering. While in search of prey they carry their bill in the manner of the Common Tern, that is, perpendicularly downwards, plunge like a shot, with wings nearly closed, so as to immerse part of the body, and immediately reascend. They were seen dipping in this manner eight or ten times in succession, and each time generally secured a small fish. Their food consisted of fishes, and a kind of small molluscous animal which floats near the surface, and bears the name of "sailor's button." They usually kept in parties of from ten to twenty, followed the shores of the sand-bars and keys, moving backwards and forwards; and wherever a shoal of small fishes was found, there they would hover and dash headlong at them for several minutes at a time.

The colours of this species are thus described: bill brownish-black, deep orange at the base; iris brown; feet vermilion, the upper part of the head, and elongated occipital feathers greenish-black; the hind neck white, the rest of the upper parts pale blueish-grey, the tail lighter; the edges of the wings, the tips and edges of the quills, and the shafts, white. The first primary is black on the outer web and part of the inner; the next two are similarly marked, but with the black shaded over with pale grey, the loose barbules being of that colour; the other primaries become gradually lighter. The lower parts are of a beautiful light roseate hue, which soon fades after death; the under surface of the wings and tail white. Length to the end of the tail nearly fifteen inches; extent of the wings thirty inches.

Allied to the Terns is the species called the Skimmer (genus *Rhynchops*), distinguished by the singular form of its bill; the upper mandible being considerably shorter than the under, appearing as if one-third of the length had been cut or worn off. The whole bill is excessively compressed, as seen in the *lower* figure of the cut. Notwithstanding the length even of the upper mandible, Mr. Swainson observes, the mouth of the bird itself is remarkably small, for it does not extend beyond the nostrils. Anterior to that part, both the upper and under edges of the lower mandible are quite sharp, but that which is uppermost is received into a very narrow groove on the corresponding piece, as if to protect and preserve its sharpness.



We now proceed to the Petrels (*Diomedia*), a race of birds which have extraordinary powers of wing, and are ever coursing over the wide waters of the ocean, and feeding upon the various kinds of putrescent and oily matters which float upon the surface. They devour dead carcases, or any other animal product of the sea that they can obtain, whether living or dead. In adaptation to this kind of food, the bill is strongly hooked at the point, where it is so formed as to cut like pincers. Both mandibles



have strong cutting edges, and are capable of dividing any ordinary substance for their whole length. The nostrils are contained within a single horny tube, opening in front, the sides being prominent and convex. Hind toe, in general, wanting; wings long and pointed.

These birds are exceedingly numerous, and as they are distributed over the whole face of the ocean, whether north or south, they are termed the scavengers of that mighty element, and appear more especially charged with the office of keeping its surface pure and clear. The name which has been given to them, or rather to the true Petrels—*Procellaria*, called by the French *Petit Pierre*—is derived from the circumstance of its apparent power of walking or running upon the surface of the water. They are susceptible of divisions into at least two genera, or sub-genera, viz., *Procellaria*, or Petrels properly so called, being of a larger size than the other, and frequenting the northern seas; and *Thalassidroma*, or Storm Petrels, which have somewhat the appearance and are about the size of Swallows, and career over the broad waters of the southern hemisphere.

The gigantic bulk of the Albatross is the next form that requires notice. These are the largest as well as, probably, the most discursive of all birds which are *pelagic*, or range over the wide seas in search of food. They live almost constantly out at sea, and are more particularly abundant in the Pacific Ocean, especially towards the antarctic regions. They are characterised by a long and stout bill, which is *sharp* in the tomia, or cutting edges, straight for the greater part of its length, but much hooked at the tip of the upper mandible, with a truncated point to the lower, exactly fitting the hook. The nostrils are tubular, opening in front, and are separated by the culmen or ridge of the bill, and not united, as in the Petrels. The mandibles act against each other, so as to give a sliding motion to the truncated part of the lower against the upper, which has a powerful effect in cutting and tearing the food. The feet have the characters of walking and swimming feet combined. They are short and stout, and well adapted for tipping the water while the bird is on the wing. The wings are very long and narrow, wedge-shaped in their terminations, the first quill being very short, and the second shorter than the third; but though rather narrow, the wings are hollow, and take a very powerful hold on the air. The tail is short and wedge-shaped, and well fortified by coverts. Thus accoutred, the Albatross is constantly coursing over the waters of the ocean, not indeed with rapid progress, but remaining on the wing for a length of time that is truly wonderful.

These birds are voracious feeders, as well as indiscriminate in their feeding. Their gullet is capacious, and capable of receiving fish of the weight of four or five pounds. The spawn of fishes, zoophytes, and other marine animals which may float on the surface of the water appear to form their chief food. There are four or five species; the Common Albatross (*Diomedia exulans*) is the species which is most frequently seen in the seas of Southern Africa, where, on account of its size and colour, it is often called the "Cape sheep." The top of the head is a ruddy grey; the rest of the plumage is white, with the exception of several transverse black bands on the back, and a few of the wing-feathers. The bill is pale yellow, and the feet deep flesh colour. It sometimes weighs as much as twenty-eight pounds, and in the stretch of its wings measures fourteen or fifteen feet.

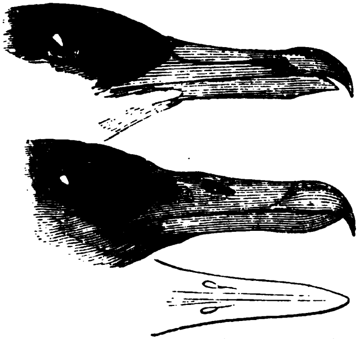
When upon the wing the Albatross seems to fly with but little exertion, and on rising from the water it strikes the surface several times with its feet, at the same time flapping its wings, before it can raise its bulky body; when, however, it has "gained its height," which in its ordinary fishing is not great, it will glide without almost any apparent motion, save the raising or depressing of the wings when it turns. They appear to do little else than sway themselves in the air, sometimes inclining to the left, and at others to the right. It is only in bad weather that their flight is at any great elevation. Their voice is stated to be exceedingly inharmonious and disagreeable, resembling, says Cuvier, the braying of an ass. As an article of food, the Albatross is but little sought after, its flesh, on account of the substances upon which it feeds, being very rank.

With the two remaining genera, *Lestris* and *Larus*, we close the ornithological circle. These birds, from the resemblance of some of their habits and characters to those of the aberrant group of the vulturine tribe of rapacious birds, may be regarded as the connecting link on the side of water birds with the raptorial order. They are birds of powerful wing, and brave the roughest tempest; they walk also with ease, having the tarsus long, and the tibiæ partially bare of feathers. They frequent the land along the coasts, in company with land birds, in search of food, on newly ploughed ground. They refuse not the most revolting substances as food, and live upon the indiscriminate refuse of the sea-shores, some of them devouring the ejected food which the more timid are obliged to yield up to their marauding enemies. They associate in large companies, or roam about singly, performing the office of scavengers of the shores, as Vultures do of the inland tropical districts.

We will point out some of the peculiarities and characteristic features of the genus *Larus*, and conclude this survey of the race of birds with the more powerful and rapacious group which have obtained the unenviable title of *Lestri* or Plunderers.

Gulls are numerous in species, and are about the shores of almost every maritime country; but they breed more freely in the northern and southern extremities of the globe than in the warmer portions. Some of them breed in cliffs and others in marshes. All of them are very miscellaneous in their feeding. They pick up substances floating on the sea, not as the Shearwater, by ploughing the surface, but by gently patting the water with their feet, whilst the bill seizes the food. They feed voraciously upon any marine animals, dead or alive, which may be cast upon the shore. They all very much resemble one another in the colours of the plumage; the young are more or less mottled, but old birds have their colours generally unbroken. The adult plumage is not acquired until the third year, and old birds have commonly more white about them in their winter than in their summer dress. Some of the species are considered not unpleasant food when young, and the eggs of many are also eaten.

The generic characters are—the bill long, or middle-sized, strong, hard, compressed, sharp edged; culmen much curved towards the tip; gonys strongly articulated; nostrils lateral, in the middle of the bill, longitudinal, and pervious. Legs slender; tarsi as long, or longer than the middle toe, naked above the joint. Hind toe very short. Wings very long. The colour of the upper plumage is generally ash coloured, varying from light bluish to blackish, the quills being dusky, with black tips; and all the under part white. The extreme whiteness of the under plumage of some of the species gives them a most beautiful appearance when cleaving the air with that graceful ease which is common to the family, and more especially when contrasted with a gloomy sky or the dark blue of a serene atmosphere. Although some of the species exhibit a daring, tyrannous character, others are so gentle in their manners, so pure in their colours, and so graceful in their motions, that, in so far as these qualities are concerned, they may vie with the dove. They associate together in large flocks,



feeding in the greatest harmony, hovering in mazy dance over the edge of the breaking wave, or wheeling in extended circles in the air.

One of the most elegant, as well as numerous and common, species on our coasts is the *Larus ridibundus*, or Laughing Gull, as it is termed, from the peculiar laughing noise that it utters when disturbed. It is distributed over many latitudes, and resorts to low marshy ground and pools of water during the breeding season. In such places it is still found to breed in England and Scotland, more particularly the latter. The nests are formed on the tops of the smaller "tumps" in the fens and marshes. The only preparation for the reception of the eggs being a flattening of the surface by the feet. The eggs are two or three in number, of an olive colour, with darker blotches. They are very clamorous in their breeding places, particularly before a change in the weather, when the more humid state of the atmosphere appears to affect them, as well as some other birds and animals, bringing out the sludge worms and mire insects, which afford a bountiful repast to them. During winter they retire more to the sea-shore, where they may be seen in large flocks upon the sand, at the edge of the water, or mixing with rooks and jackdaws, and following the tracks of the plough with the like fearlessness. They may also be observed playing about the margin of the surf for a considerable time in one spot, displaying by turns the milk-white downy feathers of their under parts, and the delicate ash-grey of the back and wing-coverts; occasionally alighting upon the water, with expanded tail and upraised wings, to procure with their bill some favourite food. At this season the head is entirely white, with the exception of a small patch in front of the eye and another at the ear-coverts; but in the summer the head and nape is of a brownish-black, except a few white feathers round the eye. The feet, bill, and orbits are red; irides hazel; rump and tail-feathers white. The young are mottled brown and white; have the bill dusky, with more or less of a reddish tinge at the base, and the feet yellowish; tips of the wings and tail-feathers black. In the second year they more approach the colour of the mature birds, but they have the head white in winter before it becomes dark in summer. Though this bird measures fourteen or fifteen inches in length, its weight is only between eight and nine ounces.

These birds are easily domesticated, and are very ornamental as well as very serviceable in gardens, where they pick up slugs, snails, worms, and other destroyers of vegetation, while the birds themselves injure nothing. Formerly the young of this bird was considered a dainty dish at table. These are the *Sea Gulles* of the ancient great festivals. In the Household Book of the fifth Earl of Northumberland, began in 1512, these *Sea Gulles* are among the delicacies for the principal feasts, and they are charged at one penny or three-halfpence a-piece. Selby says that the eggs are well flavoured, and when boiled hard are not easily distinguished from those of the Lapwing, for which they are sometimes substituted.

The largest species of this genus is the Black-backed Gull (*Larus marinus*), which measures at least two feet and a half in length, and six feet in the stretch of its wings, the weight of the bird being about five pounds. It is a bird of the northern regions, but does not extend to very high latitudes. Its superior size gives it an advantage over the smaller species, which it does not fail to apply when any food is to be obtained by the exercise of its powers and authority. It is a very voracious feeder on all kinds of garbage and carrion. It likewise devours fish, and is said to take advantage of a living prey which cannot resist its attacks. Black-backed Gulls are met with, but by no means plentifully, along most of our coasts, usually alone or in pairs, and rarely in flocks of more than eight or ten together. They breed on rocks in the Bristol Channel, and in rocky situations on the Scottish coasts. The colour of the upper parts of this bird is bluish-black; with the head, neck, breast, rump, tail, and under parts white. Bill yellow; angle of the lower mandible bright red. Feet light flesh coloured. Quill-feathers of the wing black, marked with white bars, and having white tips. The young, till the third year, are mottled with brown and white. Some of the characteristic habits of this bird are thus described by Audubon. High in the keen air, far above the rugged cliffs of the desolate shores of Labrador, proudly sails the Tyrant Gull, floating along on almost motionless wing, like an eagle in his calm and majestic flight. On widely extended pinions, he moves in large circles, constantly eyeing the objects below. Harsh and loud are its cries, and with no pleasant feeling do they come on the winged multitudes below. Now onward he sweeps, passes over each rocky bay, visits the little islands, and shoots towards the mossy heaths, attracted perhaps by the notes of the Grouse or some other birds. As he flies over each estuary, lake, or pool, the breeding birds prepare to defend their unfledged broods; or ensure their escape from the powerful bill of their remorseless spoiler. Even the shoals of the finny tribes sink deeper into the waters as he approaches; the young birds become silent in their nests, or seek for safety in the clefts of the rocks; the Guillemots and Gannets dread to look up, and the other Gulls, unable to cope with the destroyer, give way as he advances. Far off, among the rolling billows, he spies the carcase of some monster of the deep, and, on steady wing, glides off towards it. Alighting on the huge whale, he throws upwards his head, opens his bill, and, louder and fiercer than ever, sends his cries through the air. Leisurely he walks over the putrid mass, and now, assured that all is safe, he tears, tugs, and swallows piece after piece, until he is crammed to the throat, when he lays himself down, surfeited and exhausted, to rest awhile in the feeble sheen of the northern sun. Great, however, are the powers of his stomach, and ere long the half-putrid food which, vulture-like, he has devoured is digested. Like all gluttons, he loves variety, and away he flies to some well-known isle, and, not content with eggs, devours the young. Neither the cries of the parents, nor all their attempts to drive the plunderer away, can induce him to desist until he has again satisfied his ever-craving appetite. But, although tyrannical, the Great Gull is a coward, and meanly does he sneak off when he sees a Skua fly up, which, smaller as it is, yet evinces a thoughtless intrepidity, that strikes the ravenous and merciless bird with terror.

The generic characters of the Skuas (*Lestris*), differ but little from those of the last group; the principal difference appears to consist in the upper mandible of the Skuas being covered with cere; in the feet being covered with rough scales; and in the greater size and curvature of the claws. In their habits, the birds of this genus differ widely from the Gulls. Instead of exhibiting, as the latter do, the voracity and cowardly characters of the land Vultures, these are strong, bold and plundering birds, says Mr. Mudie, and as the Gulls are to some extent the Vultures of the sea, so the Skuas may be regarded as, to a similar extent, the Eagles and Hawks of the same. They not only plunder the Gulls of the food they may have procured for themselves, but they rob other birds of their eggs, and commit various depredations; which conduct on their part has not inappropriately gotten them the generic name of *Lestri*, robbers. In their breeding places, which are in countries far to the north, rarely if ever to the southward of the Orkney Islands, the larger ones repel all intruders with great resolution, and are formidable even to man himself. The Sea Eagle is driven from their haunts, being unable to contend against so numerous and resolute a tribe. But while they are thus bold in defence of their houses and broods, they are not rapacious against other birds. They partake fully more of the Vulture than the Eagle, and the larger refuse of the sea, the dead bodies of seals and whales, and all other unclean things that float upon the ocean, are food for the Skuas.* They have a watchful eye upon the Gulls, keeping the upper part of the sky, and when they observe one of them successful in fishing, and rising with its load to bear it off to its mate or young ones, the loud cry of the Skua is heard in threatening tone, and the hungry bird rushes upon its timorous victim, who disgorges the contents of its stomach, which is caught by the Skua before it reaches the water.

There are several species of this genus, nearly all of which are confined to the cold regions. A few stragglers sometimes find their way to the British shores, but their chief places are those at which the Gulls congregate in the greatest numbers.

The largest species of the genus, and the one which is most abundant and best known on our shores, is the Common Skua (*Lestris catarractes*). Its length is about two feet or upwards; the neck is short and strong, and the whole body has a firm appearance. The extent of the wings is between four and five feet, and the weight is about three pounds. The basal part of the bill has the form of that of the Gulls, only the cere extends to the nostrils, and the point or curved portion of the bill is very hard and strong. The gonys is angulated, and the feet rather slender, being naked above the tarsal joint. The tail is graduated, and the two middle feathers lengthened. The colour of the plumage approaches somewhat to that of the land birds of prey. All the upper parts are deep brown, with dull rust colour on the margins of the feathers. On the under parts the colours are the same, but lighter. The head and throat are marked with streaks of greyish-ash. The tips of the secondary quills, and the bases of these feathers, are deep brown. The tarsi and toes are covered with black scales, which are placed shield-wise, rather than reticulated; the claws are large and much curved, especially those on the inner toes; but they are not used as instruments of offence or prehension, but for securing a firm hold on the oily and slippery substances upon which the bird feeds.

---

* British Cyclopædia.

When these birds associate in numbers, they are accused of attacking the bank-building birds, depriving them of their eggs or young ones. In some places they are called Sea Eagles, and are even charged with attacking lambs; but the comparative feebleness of the muscular power of their legs, and the incapacity of the toes to grasp, would seem to argue against their attacking any living prey upon the ground, which would require the assistance of clutching claws to aid the stroke of the bill.

Though the birds assemble in considerable numbers upon the breeding grounds, which are in high latitudes, they are understood to be also in pairs; and when they are full grown, and begin to disperse themselves over the ocean, it is generally believed that they also take their departure in pairs. They make their way through the air with a bounding, jerking flight, not like the Gull, which glides away with easy flappings and even course.

Few birds, says Audubon, surpass the Arctic Jager (*Lestris parasiticus*), or Black-toed Gull of some authors, in power or length of flight. It generally passes through the air at a height of fifty or sixty yards, flying in an easy manner, ranging over the broad bays, on which Gulls of various kinds are engaged in procuring their food. No sooner has it observed that one of them has secured a fish, than it flies to give chase. It is almost impossible for the Gull to escape; for the warrior, with repeated jerkings of his firm pinions, sweeps towards it with the rapidity of a Peregrine Falcon pouncing on a Duck. Each cut and turn of the Gull only irritates him the more, and whets his keen appetite, until, by two or three sudden dashes, he forces it to disgorge the food which it had so lately swallowed. This done, the poor Gull may go in search of more; the *Lestris* is now for a while contented, and alights on the water to feed at leisure. But soon, perceiving a distant flock of Gulls, he rises on wing and speeds towards them. Renewing his attacks, he now obtains an abundant supply, and at length, when quite gorged, searches for a place on which to alight, unseen by any other of his tribe more powerful than himself.

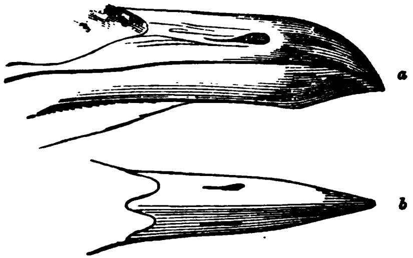
The northern parts of Europe and the colder latitudes are resorted to by this bird, where it is found in pairs or single; it is said, however, to breed in groups. Mr. Selby, in treating of this bird, says it breeds upon several of the Orkney and Shetland Islands, and is gregarious during that period; and the situations selected for nidification are the unfrequented heaths at some distance from the shores. The nest is composed of dry grass and mosses; and its two eggs are of a dark oil-green, with irregular blotches of liverbrown. At this season the bird is very courageous, and like the Common Skua, attacks every intruder upon the limits of its territory, by pouncing and striking at the head with its bill and wings.*

In middle age this bird has all the upper parts greyish-brown, without spots; lower parts of a somewhat lighter tint, and also unspotted; inner base of the quills and only the upper parts of the tail-feathers pure white, the rest blackish-brown; the two elongated tail-feathers gradually diminish in breadth towards the extremity, which ends in a very attenuated joint. Mature birds have the bill greyish-black, the upper part bluish. Iris brown. Feet black, but with the greater part of the tarsus yellow. The neck and lower parts are white, the former tinged with yellow; upper and fore part of the head, with the space before the cheeks, blackish-brown; the lower part of the neck and all the upper part blackish-grey; the primary quills and tail-feathers brownish-black, the shafts of the former white. Length to the end of the tail twenty-three inches, extent forty-five. The female resembles the male, but the middle tail-feathers are about three inches shorter.

Having now completed the circuit of the Ornithological system, we give a representation of the bills of two of the neighbouring groups or genera of *Lestris* and *Vultur*—the one being that of *Lestris parasiticus* (*a*); and the other of the Black Vulture, *Cathartes atratus* (*b*)—in order to show their near approximation in form.

---

* British Ornithology.



In this faint sketch or outline of a circular system, we have endeavoured to trace out the links by which the various orders, tribes, families, and sub-families are united, so as to form one continuous chain of natural affinities, and to develope the peculiar ends attained by the various modifications of form and habit, so diversified and striking, throughout the class. A more minute analysis of all these structural differences and approximations would have been inconsistent with the plan of the treatise; we must therefore refer those who desire further information than these volumes contain, to the elaborate scientific works of the eminent writers in this branch of Natural History whose labours are not less the glory of our age than honourable to themselves.

List of Plates,

IN THE ORDER IN WHICH THEY ARE PLACED.

Gulls, Terns, etc.—*Frontispiece.*
  - Sea Swallow (*Sterna Hirundo*).
  - Gull (*Larus*).

Pigeons.
  - Wild Rock Pigoon (*Columba lina*).
  - Wood Pigeon (*Columba Ænas*).

Pheasants.
  - Ring-necked Pheasant.

Grouse.
  - Ruffed Grouse (*Tetrao umbellus*).

Bustards.
  - Little Bustard (*Otis tetrax*).

Plovers.
  - Common Lapwing (*Vanellus cristatus*).

Snipes, etc.
  - Dunlin (*Tringa variabilis*).
  - Avocet (*Recurvirostra Avocetta*).

Herons, etc.
  - Common Bittern (*Butor stellaris*).

Storks.
  - Glossy Ibis (*Ibis Falcinellus*).

Geese, Swans, etc.
  - Berwick (*Cygnus Bewickii*).
  - Mute (*Cygnus olor*).
  - Polish (*Cygnus immutabilis*).
  - Hooper (*Cygnus ferus*).

Ducks.
  - Scaup Pochard.
  - Common Sheldrake (*Tadorna Vulpanser*).

Pelicans.
  - Crested Cormorant (*Phalacrocorax cristatus*).